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Should You Trust the New Apple Watch on Blood Oxygen Readings?

— The Skeptical Cardiologist peels back the hype

by Anthony Pearson, MD September 21, 2020













Apple announced last week the release of Apple Watch Series 6 (AW6) which features a "revolutionary Blood Oxygen feature." That raised some questions:

- How accurate or useful (or revolutionary) is that blood oxygen feature?
- Should those who can afford the \$399 rush out and buy one?
- Can the future of health really be on our wrist?

Although the Skeptical Cardiologist loves his Apple Watch 4 (especially the ECG feature) and thinks a home pulse oximeter can be useful during COVID-19, he hasn't yet ordered the AW6. Let's examine why.



What Is the Accuracy?

Apple's marketing release tells us that their blood oxygen sensor "employs four clusters of green, red, and infrared LEDs, along with the four photodiodes on the back crystal of Apple Watch, to measure light reflected



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back from blood. Apple Watch then uses an advanced custom algorithm built into the Blood Oxygen app, which is designed to measure blood oxygen between 70 percent and 100 percent."

Apple does not provide references to any studies or data that would support the accuracy of their new approach but does mention three health studies they are partnering in that will look at the AW6's utility in asthma, heart failure, and COVID-19.

Although we don't know anything about AW6's accuracy, we do have studies showing us that reflectance oximetry (used in AW6) is not as accurate or stable as transmittance oximetry (used in fingertip pulse oximeters.) It's important to understand this significant technological difference, so please indulge me for two paragraphs.



Oximeters determine oxygen saturation (SpO₂) in tissues by quantifying the concentration of hemoglobin bound to oxygen (oxyhemoglobin or HbO₂) and hemoglobin (Hb) without oxygen. Pulse oximeters, which are widely utilized in medical settings, utilize photoplethysmography (PPG) performed on pulsatile arterial blood at two different wavelengths to obtain a ratio of HbO₂ and Hb. Optoelectronic sensors composed of light-emitting diodes and photodiodes that operate at red and near-infrared wavelengths capitalize on the differing absorptivity of Hb and HbO₂.

Transmission-mode oximetry has been the gold standard but requires sensing at tissue locations that can be transilluminated with the light shining through the tissue such as the earlobes and fingers.

With reflective mode oximetry, the light sources and photodiodes are on the same side of the tissue and a thin measurement site is not required. Thus, it can be used at measurement sites such as the forehead, chest, and (most relevant for this discussion) the wrist, where a band or watch can be utilized.



for the duration of the declaration that circumstances exist justifying the authorization of emergency use of in vitro diagnostics for detection and/or diagnosis of COVID-19 under

Reflectance mode oximetry, the mode utilized by Apple Watch, has been shown to be inferior to the transmission mode used by fingertip pulse oximeters, likely due to increased variability introduced by ambient light, the pressure applied, and positional variation inherent to the method.

Some smartphone apps have claimed an ability to measure SpO₂ using reflectance, but when two were studied they were found to be seriously inaccurate. Walter Schrading, MD, who co-authored the smartphone oximetry study, has told me that he does not recommend any smartphone app as a reliable pulse oximeter.

Pending the release of any data or objective study of the AW6's accuracy, it is difficult to recommend individuals purchase the device for the purpose of monitoring oxygen levels. Although Apple uses the adjective "revolutionary," its competitors (FitBit and Garmin) have offered various bands and watches with SpO₂ capability for several years.



Should You Purchase Apple Watch 6?

As soon as Apple announced ECG capabilities on its AW4 in the fall of 2018, I signed up to get one and I love it and cannot stand to be without it. I'm an unabashed Apple fan and tech junkie.

With a touch of the screen I can start a timer, check my heart rate or heart rate recovery, initiate a work-out, play music on my AirPods, check the weather, read and respond to text messages, or make a recording.

The ECG icon is not on there but readily accessible should anyone near me suddenly pass out or should I feel my heart palpitating.

So if you have no Apple Watch or an AW3 or less, have the money, and want all of the above nifty features seamlessly integrated with your iPhone plus handy ECG capabilities, go for the AW6.

Is It Worth Upgrading From AW4 or AW5?

MAS-ADD-552

Apple is really promoting the new Apple Watch for wellness and health enthusiasts:

Case: 24-1285



"Apple Watch Series 6 delivers many notable hardware improvements, including a faster S6 System in Package (SiP) and next-generation always-on altimeter, along with its most colorful lineup yet, featuring a beautiful palette of new case finishes and bands. watchOS 7 brings Family Setup, sleep tracking, automatic handwashing detection, new workout types, and the ability to curate and share watch faces, encouraging customers to be more active, stay connected, and better manage their health in new ways."

Of those new features mentioned, the only one that I'm interested in is sleep tracking. I've assessed many different sleep tracking wearables, including the Oura ring, the Garmin VivoSmart (which offers nocturnal oxygen saturation, by the way), and multiple iPhone apps and have found them all to be inaccurate. They primarily rely on actigraphy to determine sleep versus wake.



We don't know any details about the AW6 sleep tracking. This shot from the Apple website suggests to me the information will be rudimentary.



Matt Walker, author of "Why We Sleep," believes that all wearable sleep trackers have an accuracy of about 70% in determining sleep versus wake and the stage of sleep. (He serves as scientific advisor to Oura.) He makes an interesting comment in a recent Peter Attia podcast that "stickiness" is as important as accuracy when it comes to sleep tracking. Stickiness refers to how likely we are to continue using and wearing the device during sleep.

The Oura ring is very sticky. I continued to wear it for months after I had concluded it was not helpful in tracking or optimizing my sleep. The Apple Watch, due to its size and location, is not something I want to wear to bed frequently and therefore is not sticky.



My Apple Watch has long been reporting to me that I have an unbelievably good VO₂ max (54 mL/kg/min, whereas the average for men ages 20-29 years is 48).) Apple does not reveal how it calculates this key exercise parameter; like the AW SpO₂ and heart rate variability, the number cannot be relied on. My AW VO₂ max jumped up 10 mL/kg/min for no apparent reason 2 months ago and has remained there since.

Apparently, AW6 tweaks the $\rm VO_2$ measurement and reporting. The company needs to be transparent about how it is measured (really estimated, as there is no way they can measure it) before I would rely on it for anything.

Thus far, I haven't felt the urge to upgrade to the AW6. If you are primarily excited by the blood oxygen sensing capabilities of AW6, I would recommend instead purchasing a \$20 finger tip pulse oximeter. At least we have some data on these devices, which use the more reliable transmission mode for measuring oxygen saturation.



If you are excited by the sleep tracking capabilities,

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consider whether you want to wear a bulky watch to bed that is likely inaccurately telling you how much you slept.

Anthony C. Pearson, MD, is a noninvasive cardiologist and professor of medicine at St. Louis University School of Medicine. He blogs on nutrition, cardiac testing, quackery, and other things worthy of skepticism at The Skeptical Cardiologist, where a version of this post first appeared.

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The Washington Post

Democracy Dies in Darkness

The new Apple Watch says my lungs may be sick. Or perfect. It can't decide.

Both the Apple Watch Series 6 and Fitbit Sense have new blood-oxygen apps. They're mostly useless.

By Geoffrey A. Fowler

September 23, 2020 at 7:00 a.m. EDT

Sometimes the new Apple Watch Series 6 reports my lungs and heart are the picture of health, pumping blood that's 100 percent saturated with oxygen.

At other times, it reports my blood oxygen is so low I might be suffering from emphysema. (I am not.)

The watch can't decide. This much is clear: Don't buy one of these \$400 devices in the hopes of monitoring your lung health.

An Apple oxygen check a day will not keep the doctor away, at least not yet. The way consumer tech companies are marketing health capabilities is getting ahead of what their gadgets can actually, reliably do. That's a dangerous trend, and it jeopardizes the potential positive effect that collecting body data could have on our health.

It's particularly deceptive at a time when many people are looking to health monitors for any clue that they may have covid-19, the illness caused by the novel coronavirus.

For the past week, I've been wearing a smartwatch on each wrist, all day and all night long. On the right I have the Apple Watch Series 6, and on the left I wear the new \$330 Fitbit Sense, which went on sale this week.

There are many reasons people buy wearable gadgets. I wear an Apple Watch for fitness motivation and to receive phone notifications, and an <u>Oura Ring</u> to track my sleep. But this fall's smartwatch upgrades from Apple and Fitbit are all about health. Apple's slogan reads: "The future of health is on your wrist."

These watches also read heart rate and rhythm, but I'm focusing this review on the headline addition to the Apple watch and the Fitbit: an oximeter, which measures the oxygen in your blood. Doctors are increasingly treating oxygenation as a vital sign (alongside pulse and temperature) because it can help reveal aspects of conditions including sleep apnea, pulmonary embolism and covid-19. That certainly sounds helpful to have on your wrist.

That's what Apple Vice President for Health Sumbul Ahmad Desai implied at Apple's prerecorded launch event. "Adding blood oxygen brings another valuable health measurement to users. Blood oxygen and pulse oximetry are terms that we've heard a lot about during the covid pandemic," she said.

But you start to get a different picture when you read what both companies say in their disclaimers. Neither device is approved by the Food and Drug Administration.

The tiny type at the bottom of Apple's website says its blood oxygen app is "not intended for medical use" and is "only designed for general fitness and wellness purposes." Fitbit's small print says its blood-oxygen app is "not intended to diagnose or treat any medical condition" and is useful to "help you manage your well-being and keep track of your information."

There are important differences in the blood oxygen data that Apple and Fitbit report. But in my experience, neither company's measurement serves much purpose at all. You should know what you're buying, because it might do more harm than good.

Measuring blood: Finger vs. wrist

To understand my frustrating Apple Watch readings, I called pulmonologists who haven't had a chance to test the watches but understand the science. When doctors test blood oxygen, they often use sensors on fingers called pulse oximeters. These devices shine light through the skin and nail to detect the color of the blood as a measure of how much oxygen is there. They produce a measure called SpO2; most healthy people range between 95 percent and 100 percent.

The finger oximeters used by doctors are approved by the Food and Drug Administration. To compare my smartwatch results, I bought a finger oximeter for \$60 from Medline Industries that is FDA approved and reports an error rate of plus or minus two percentage points.

Unlike finger pulse oximeters, these two smartwatches try to read your blood oxygen from your wrist. And they're conspicuously silent about accuracy.

Apple's new watch has lights on the bottom to generate signals that are reflected back from the blood in your wrist and read by sensors. An app lets you do spot checks anytime and also runs on its own while you sleep. You have to hold really, really still for 15 seconds to get a reading.

The first time I tried this on the Apple Watch 6, it said my oxygen level was 88 percent — shockingly low, given that I am in good health and wasn't wheezing. Five minutes later, I tested again and it said my SpO2 was 95 percent. I kept trying it and kept getting different readings — and, frequently, an "unsuccessful measurement" error message.

I told Apple about my experience, and it sent me a new watch. My first measurement on my second Apple Watch 6 reported my SpO2 as 100 percent. If these readings were accurate, my lungs were having a really wild Wednesday.

Over several days of comparing my second Apple Watch's measurements to my FDA-approved finger oximeter, Apple's readings most often differ by two or three percentage points — though they've also sometimes exactly matched, and sometimes have been as much as seven percentage points lower.

Is it just me? Skin, fat and blood vessels do vary. Apple would not comment on the error rate of its sensor, but spokeswoman Amy Bessette said it "has been rigorously tested across a wide spectrum of users and across all skin tones." (When I tested the Apple Watch on a colleague whose skin is darker than mine, the results were also off from the finger pulse oximeter, but less wildly so.)

Bessette also said, "For a small percentage of users, various factors may make it difficult to get a blood oxygen measurement including motion, watch placement on the wrist, skin temperature and skin perfusion, and the blood

oxygen app provides dynamic feedback to help users get the best reading possible."

The company sent me additional Apple watch straps — eight in total — to wear while testing its second watch. This year, Apple is selling a new kind of stretchy band that is called the Solo Loop and comes in a variety of sizes. Going down one size (to a model that leaves a slight imprint on my wrist) did eliminate some but not all of the "unsuccessful measurement" error messages.

With the Fitbit, I've had less-erratic results, but the device also provides a lot less information. You can't ask the Sense to run spot checks. Instead, it measures your SpO2 while you sleep and provides a nightly average.

My oxygen level, Fitbit reports, is typically in the range of 95 percent to 97 percent. That sounds believable, though I can't compare it to results from my finger pulse oximeter because I'm not awake to turn it on.

In an interview, Fitbit's director of research, Conor Heneghan, said the company decided the overnight view was a more reliable piece of information. "It's a pretty hard technical problem to measure SpO2 on the wrist," he said. Unlike fingers, which have many blood vessels near the surface that offer a strong signal, the wrist is prone to obstructions and poor readings.

"You move a little bit, or even just you are a little bit colder than normal, you can get a very weak signal," Heneghan said. "We've gone after long-term averaging, so that way, when we take overnight measurements, we can comfortably exclude the periods when we feel that signal is too noisy or weak to be reliable."

Heneghan still wouldn't disclose the Fitbit's exact error rate. But he said it beats the range set by an international standards organization. That's not much to brag about: It would allow someone with a true SpO2 reading of 95 percent to be told they're at 91 percent.

He was forthcoming on the testing Fitbit did, such as working with a lab at the University of California at San Francisco to test the device on volunteers, including people with different skin tones. "We tried to overrepresent darker-skin-toned people in our testing to make sure that it's not skewed toward a particular tone," he said.

Marketing vs. medicine

Let's be clear: These companies are marketing a device with medical functions while winking and insisting they're not medical functions. Okay, so then what else, exactly, are we supposed to use oxygen apps for?

Fitness? You can't use these sensors while you work out. Just the slightest bit of movement — even breathing too heavily — sends my Apple Watch into error mode. Neither Apple nor Fitbit makes any effort to explain how your SpO2 levels might be linked to your workouts. (SpO2 is different from another oxygen indicator called VO2 Max, which measures how your body uses oxygen while you exercise.)

That leaves us with the industry's term "wellness." So, are we supposed to get together with friends over drinks and talk about O2 stats? "Hey, bud, my hemoglobin works better than yours!"

Whatever the fine print might say, some people are going to treat these as medical devices — and that's a concern.

"Pulse oximeters can tell you in a trending situation if your oxygen is in the normal range," said Albert Rizzo, the chief medical officer for the American Lung Association. But it's not necessarily a leading indicator of problems, including covid-19. "Nobody should be waiting for their pulse-ox to go down before calling their doctor." he said.

There could be consequences if consumers actually believe the hype about these devices. "I agree with you that it is a dangerous trend for technology companies to release medical devices that don't meet FDA standards and claim that they are not medical devices," said Brian Clark, a pulmonologist and professor at the Yale University School of Medicine.

The most common negative consequence is likely to be people calling their doctors too often because of false low readings. "But the more concerning and potentially dangerous scenario is when the devices provide false reassurance and people don't seek health care when they really need it," Clark said.

Apple was more upfront in 2018 when it <u>added an electrocardiogram</u>, or ECG, app to its watch. It did get FDA clearance (not quite the same as "approval") for its app, and worked with researchers to publish studies on its accuracy. But still, there's fine print: the Apple Watch's irregular-rhythm notification is not intended for use by "those who have been previously diagnosed with atrial fibrillation (AFib)."

Fitbit said an ECG app it added to the Sense this year also received FDA clearance. Why not do the same for the oximeter? "If we were to make a claim, like we could detect sleep apnea, we would definitely go through the regulatory process and be very clear on our messaging and very clear on the limitations," said Fitbit's Heneghan.

A release-with-disclaimers approach could leave consumers without guardrails as more body sensors come to market. To the Sense, Fitbit also added a skin temperature sensor and an electrodermal activity sensor — similar to what's in a polygraph — that it says "may indicate your body's response to stress." Neither of those sensors has been cleared by the FDA.

Questions about accuracy also interfere with the work of academics combing through the body data from smartwatches to see if it can be used to detect disease. This summer, I wrote about <u>promising early results from academics</u> using heart rate and temperature data from the Oura Ring and Fitbit to predict the onset of covid-19 symptoms.

Several of those researchers told me they were excited by the addition of blood-oxygen data — but there's not enough information about its validity. "We have toys, and we have things that are used for clinical purposes. And it really needs to be a clear distinction," said Duke University's Jessilyn Dunn, an assistant professor of biomedical engineering who is helping to lead a study called Covidentify.

It should not be acceptable for giant tech companies to market devices that take readings of our bodies without disclosing how those devices were tested and what their error ranges might be.

I believe collecting accurate data about our bodies can help advance our health. But the key word here is "accurate."

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PERSONAL TECHNOLOGY: JOANNA STERN

Apple Watch Series 6 and SE Review: Watch Out for the Upsell

Apple's latest watches do very few new things—but if you're a first-time buyer or upgrading from a much older model, there's a lot to consider



4/28/2021

By <u>Joanna Stern</u> | Photography by Kenny Wassus/The Wall Street Journal Sept. 24, 2020 9:00 am ET

There is only one thing I'd urge you to wear this year: <u>a mask</u>. Oh, and pants. Please wear pants—even on video calls.

And what about the brand new \$399 <u>Apple</u> AAPL -0.60% ▼ Watch Series 6? Nope.

Hold up. Shouldn't this be *the* year I encourage you to put cutting-edge health tech on your wrist? Wearables are now doing everything from <u>scanning for early signs of infection</u> to detecting heart problems to automatically <u>calling emergency services if you fall</u>.

SHARE YOUR THOUGHTS

What is most important to you in a smartwatch? Join the conversation below.

Sure, the top-of-the-line Apple Watch Series 6 can do that stuff but so can models that cost far less.

If you have already got a two- or three-year-old Apple Watch, the gains with this new model aren't substantial. Same screen, same battery life, same core functionality. And I found this year's standout health feature—a blood-oxygen sensor—not ready for prime time, not to mention not useful.

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Plus, if you're a first timer, or in need of an upgrade, Apple now has two other lower-cost options: the Apple Watch SE and Series 3. Actually, make that three: The best deal going right now might be a refurbished Series 5.

It is <u>OK to be confused</u>. I'm here for you. After testing all the models last week—along with the \$330 <u>Fitbit</u> Sense—I have arrived at a new theory of Watch-Nomics: You should upgrade your Apple Watch every three to five years. Any sooner, and spending more on a watch doesn't mean proportionally more features. So make the call on your needed features, then make a purchase.

The Choices

Remember your SAT multiple-choice tactics? Eliminate two choices and you suddenly have a 50/50 shot at a correct pick. Buying an Apple Watch is like that:



Do not collect them all! The Apple Watch Series 3, SE and Series 6, all on one wrist, from left to right.

- A) **Apple Watch Series 6 (\$399):** This one has the larger screen introduced in 2018, with an always-on display showing the time. It now has a slightly faster processor, slightly faster charging and the full health package, including an ECG electrical heart-rate sensor and new blood-oxygen sensor.
- B) **Refurbished Apple Watch Series 5 (\$329):** It's basically a Series 6 without the blood-oxygen sensor. Apple stopped marketing it, but at time of publication, you could still find some variations in its refurbished store.
- C) **Apple Watch Series SE (\$279):** This resembles a Series 5 or 6, but without the always-on display, ECG or blood-oxygen sensor. It still has heart-rate tracking and notifications

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for high, low and irregular heart rate, as well as fall detection.

D) **Apple Watch Series 3 (\$199):** OK, almost there. This one has an older design with a smaller screen, slightly shorter battery life and slower performance. It also has heart-rate tracking and heart-rate notifications, but no fall detection.

The Features

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I anticipate most will choose A or C, especially if Apple runs out of refurbished Series 5s. So the real question is this: Are a blood-oxygen sensor, an ECG and an always-on display worth \$120?

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When I got the blood-oxygen sensor to work, most of my readings were in the healthy high-90% range. During a visit to my doctor, the watch even compared point for point with a medical-grade vital-signs monitor. However, often when I would manually initiate the 15-second test, I would get an "Unsuccessful Measurement," indicating that the test didn't work. Sometimes I would get a lower reading, like 94%—even when my trusty \$45 Walgreen's pulse oximeter said 99%.

The little disco ball of green and red lights on the back of the watch needs to be steady, flush and tight against the skin to get a reading. The new, wonderfully comfortable Solo Loop straps help with that, but apparently mine was a bit too loose. Sliding the watch up my wrist a bit more has improved this. Still, using this is far too unreliable and inaccurate —even if Apple doesn't suggest this for medical use.

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The Series 6 measures blood-oxygen levels, though not as reliably as a dedicated pulse oximeter.



Often after the 15-second blood-oxygen test, this "Unsuccessful Measurement" notification would appear. Sliding the watch up the wrist tended to fix the issue.

An Apple spokesman provided this statement: "The Blood Oxygen feature has been rigorously tested across a wide spectrum of users and across all skin tones. For a small percentage of users, various factors may make it difficult to get a blood oxygen measurement including motion, watch placement on the wrist, skin temperature and skin perfusion."

But even if this all worked, there isn't a clear enough reason for me to need this on my wrist all the time. Why shouldn't I just pull out a pulse oximeter if I'm worried? While a low blood-oxygen level can be a gauge for the severity of Covid-19 and other conditions, there is no Apple Watch alert if yours drops below a certain threshold.

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Apple says this is a wellness and fitness feature, not a health one, and it is beneficial to those who travel to places with higher altitudes or who are involved in performance training. Also, much like the heart-rate sensor, which is proving to be central to <u>Covid-19</u> <u>wearable studies</u>, the blood-oxygen sensor can now be used to collect data to build detection algorithms and further medical research.

As for the always-on display, while I do appreciate being able to glance down and see the time without tapping on my wrist, I have had it disabled on my Series 5 for most of the year to eke out a bit more battery life. I'm even more interested in saving battery now that sleep tracking arrived with WatchOS 7.



The \$399 Apple Watch Series 6, top, and the \$320 Fitbit Sense, bottom, have heart-rate and blood-oxygen sensors.

No matter which model you pick, you have to recharge every day or so. If you sleep with your watch, you have to charge it when you wake up. Compare that to the \$330 Fitbit Sense, which I charge every five days or so. It keeps tabs on your temperature, blood oxygen and heart rate. That said, it lacks a lot of the non-health functionality of the Apple Watch, and Fitbit's software can be slow and buggy.

The ECG is really the only feature I would consider for the extra money. You have to follow your heart on that one (sorry, had to.) It's a shame Apple pulled a vital health feature from the former Series 4 or 5 model it's now calling SE_{page} of 7

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The Future

Rewind the clock <u>to 5½ years ago</u> to when the Apple Watch first shipped, and the technical leaps are massive—waterproofing, bigger screens, better battery life, advanced sensors. Alongside those leaps, the product found its central purpose: fitness and health.

But it was mostly there with the Series 4. So why has development slowed to a snail's pace since then? There could be two reasons: Apple engineers haven't quite gotten the next major improvements right (multiday battery life in a thinner package), and Apple realized no one wants to buy a watch every two years like a smartphone. It makes you wonder why we need yearly updates on these at all?



The new Solo Loop bands don't have any clasps or buckles. You just slide your wrist into the stretch band.

Big leaps are still coming. I had a vision of it when I was hooked up to that monitor at my doctor's office. The Series 6 already does two of the four readings: pulse and blood-oxygen levels. Temperature and blood pressure? Not yet. By combining more advanced health sensors and software that detects fluctuations, the Apple Watch and other wearables are going to become our ever-present health care minders.

In the here and now, though, the answer isn't to buy a new one whenever a sensor gets added—especially when it doesn't necessarily work. If you have an older model, grab a pulse oximeter from your drugstore and the super comfy \$49 Solo Loop band from an Apple Store and call it a day. If it ain't broke, don't Series 6 it.

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Write to Joanna Stern at joanna.stern@wsj.com

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Apple Watch Series 6 review: minute improvements

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The watch is great, the blood oxygen monitor is not

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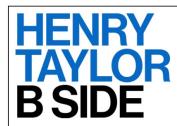
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eirdly, the fact that the Apple Watch Series 6 is the very best smartwatch by a huge margin feels anticlimactic. That's probably because the same was true of the Series 5, the Series 4, and even the Series 3. At this point, the company would have to massively screw something up with the Apple Watch for it to be knocked out of the lead spot.

Apple didn't screw anything up. But that's not the same thing as significantly moving forward, either. The Series 6's updates comprise a bunch of very minor updates that will be unnecessary to the vast majority of people who will buy it. The headline feature, blood oxygen monitoring, also fits in that category.

Starting at \$399, it's not the best deal you can find for your wrist, but it justifies its cost by offering a ton of value — just not enough value compared to previous generations that you'd notice it. It's an iterative update, in other words.



9 Apple Apple Watch Series 6 \$399 THE GOOD THE BAD Big, bright display Still no third-party watch Solid ecosystem of thirdparty complications Still no Android phone support Built-in sleep tracking Blood oxygen monitoring is unreliable. \$399 AT AMAZON \$399 AT BEST BUY \$399 AT B&H PHOTO

AT THE WHITNEY

How we rate and review products



The Apple Watch Series 6 maintains compatibility with all the same watch straps.

Apple Watch Series 6: hardware updates

ther than the fact that there are new color options like red and blue, it's virtually impossible to distinguish the Series 6 from its predecessor. The only tell is that the sensor array on the bottom is different to accommodate the blood oxygen sensor on the newer watch. It's still a lozenge-shaped square with a big. beautiful

Apple is now banned from selling its latest Apple Watches in the US

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screen and it still offers an array of finishes in two sizes, 44mm and 40mm.

The Series 6 has slightly faster charging — in my tests it was charging from zero to 100 percent in a little over two hours, while the Series 5 hit 80 percent. That's a fairly minor bump, but it is marginally useful since more people will be looking to charge it at in-between times so they can take advantage of the new sleep tracking features in watchOS 7.

The Series 6 is physically indistinguishable from the last generation



A new Apple Watch watch face.



The buttons are unchanged on the Apple



The sensor array on the bottom is different because of the new blood oxygen monitor.

There's a new processor inside the Series 6, but that hasn't affected my experience at all — battery life and speed both appear to be identical to last year's model. That means I'm getting about a day and a half (including sleep) on a single charge, but less if I use it for exercise tracking.

The always-on standby screen is brighter than on the Series 5, but I never really had a huge problem with brightness on the older model. Finally, there's an always-on altimeter and the aforementioned blood oxygen sensor.

Add all those iterations up and I believe that if you have a Series 5 or Series 4, there's not a compelling reason to upgrade. This many generations in, it's clear that the upgrade cycle for the Apple Watch ought to be closer to three or five years for most people.

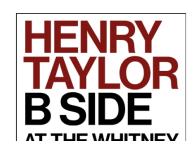
If it is time for you to get an Apple Watch — either your first one or as an upgrade — a harder question for me to answer is which one to get. There's the Series 6 and there's also the new Apple Watch SE, which lacks an always-on screen but otherwise supports the vast majority of things most people want out of a smartwatch. The low-cost Series 3 is still sticking around, and heck, if you can find a refurbished Series 5 or 4 I think either

of those would be a good buy.

Trying to parse the differences between the different Apple Watch models is about as difficult as trying to distinguish the dozens of slightly different phones Samsung makes. Instead of offering clear choices based on features, Apple is flooding the zone with an option at every conceivable price point from \$200 on up to well over a thousand bucks.

My honest advice is to spend as much as you're comfortable with, and don't sweat that you're missing something vital by ignoring the upsell. Because the truth is that the things that make the Apple Watch Series 6 great are shared by all those other Apple Watches.









There's a new "artist" watch face.

watchOS 7

If you haven't looked into the third-party app ecosystem for the Apple Watch in awhile, I bring you good news: it's great now. There are third-party apps for many of the things I want on my watch, including bike ride tracking, trail maps, Google Maps, and more detailed weather apps.



I don't usually get to these apps via the Apple Watch's app list, though, I usually launch them via watch face complications. Apps can now put more than one on a single watch face, which offers just a bit more customization. I still can't find a single watch face I like to use all the time, but the new options do make it easier for me to set activity-based faces to switch between. I have a work face, a weekend face, a biking face, and a cooking face.

The watch face I use for cooking, Count Up, is nice because it has a built-in stopwatch in addition to the main stopwatch app. Of course, it's only necessary because Siri still can't set multiple timers.

The Apple Watch now does native sleep tracking, but I might end up sticking with a third-party app for that. Apple's system is built in, but it pushes you into using Apple's wind-down bedtime feature. I find its

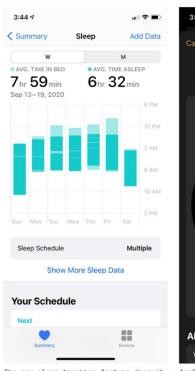
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bedtime reminders restrictive and sometimes even patronizing — it's worse than my parents were when I was eight and stayed up too late reading with a flashlight. Anyway, watchOS 7's sleep tracking reports are also less detailed than what you can get from a third-party app or even from another smartwatch like the Withings HR.



The new sleep tracking feature doesn't provide a ton of data.



Apple has a new bedtime feature that works, but is restrictive when it comes to DND options.

Later this year, Apple will release its Fitness Plus service that integrates with the Apple Watch by displaying your health stats on top of workout videos. I wasn't able to test that, but I'll be interested to give it a try when it releases. I did use Apple's new biking directions fairly extensively and found them really helpful — but I'm also lucky enough to live in an area where they're available.

The most intriguing new feature in watchOS 7 is Family Setup, which lets you set up a cellular Apple Watch for a kid or parent as a managed device. My colleague Dan Seifert has been testing it and will have much more to say about it in another review. Here, I'll just note that Dan tells me that unless you spend a lot of time configuring stuff as a parent, you're effectively handing a full Apple Watch with all its features and complexities to a child, which seems like a lot to me.

And I know it's about as effective as howling at the moon, but I do wish Apple would find a way to make the Apple Watch available for Android users — even if it's only by making it even more independently useful.







The blood oxygen monitor often can't get a reading.

Blood oxygen tracking

have been covering gadgets for a very long time now and in that time I've built up a strong aversion to gimmicky health gadgets. Every time I go to the Consumer Electronics Show I am beset with small companies making vague claims that their wellness devices will do something vital for my health — and those claims wilt under the slightest inquiry about scientific rigor, academic studies, or FDA clearances.

I've never associated the Apple Watch with those digital snake oil gadgets because Apple has historically been responsible about its claims and features. For the blood oxygen monitor, Apple is not making any specious claims. But because the results it provides require so much context and are unclear so often, I trust this blood oxygen monitor way less than I trust the other sensors on the watch.

The system works in one of two ways. First, you can measure your blood oxygen manually. To do so, you need to rest your arm on a horizontal surface for 15 seconds while it takes a reading. More importantly, though, you have to make sure the watch is quite snug and correctly placed on your wrist. It needs to be positioned a ways up your arm — quite a bit higher than how I usually wear a watch.

If you don't follow the instructions exactly, you likely won't get a reading. And when you do, the results are still inconsistent.



The blood oxygen monitor's light is quite bright, so much so that you can turn it off when you're in theater mode.

If you follow the directions to a T, you'll usually get a reading. Sometimes you won't, though, and for me that happened much more often than I was expecting. A blood oxygen level over 95 percent is generally considered okay and anything under that may be a sign of a problem. Generally, when I tested the Apple Watch against a finger monitor, the finger monitor gave me a higher reading.

The other way the monitor works is that it tries to read your blood oxygen in the background while you are going about your day or sleeping. Here, I often got numbers that were lower than I expected — I think often because the watch wasn't positioned correctly for an accurate reading.



Other reviewers have run into similar issues. Joanna Stern at the Wall Street Journal and Geoffrey Fowler at the Washington Post both reported unreliable results. In a statement to the WSJ, Apple says:

"The Blood Oxygen feature has been

rigorously tested across a wide spectrum of users and across all skin tones. For a small percentage of users, various factors may make it difficult to get a blood oxygen measurement including motion, watch placement on the wrist, skin temperature and skin perfusion."

Apple also says that this blood oxygen monitor is a "wellness" feature, that it's not meant for medical diagnostics, and that it isn't seeking any sort of FDA clearance for it. It won't be used to send you alerts of troubling results like the heart rate monitor can.

And to be ultra clear: this is not a COVID-19 detector or early warning system. Apple is taking part in studies to see if the sensors on wearables can do something to help with early detection, but those results won't come in for some time.

Several other smartwatches have blood oxygen monitors, and it may be that trying to measure blood oxygen from your wrist is just inherently problematic. Nicole Wetsman just reviewed the Withings Scanwatch and found its results to be consistently wrong. (Withings is awaiting a sign-off from the FDA before it distributes it in the US.)

I'm just not sure who Apple intends to use this feature. If you happen to be a high-altitude endurance runner who's super into quantified self statistics, I think you'll find a use for it. If you're not that person, I am not sure that you'll get anything useful from this sensor.



The Apple Watch Series 6, in Product Red.

espite my reservations with the blood oxygen detection, the Apple Watch Series 6 is the best smartwatch for the iPhone. The inconsistent results I (and others) got measuring blood ovvgen levels don't take away from what makes the Annie Watch great

https://www.theverge.com/21496141/apple-watch-series-6-review-blood-oxygen-monitor-watchos-7

onygen tereis don't take away from what makes the hypic traten great in the first place.

It has very good fitness and health tracking, and Apple's Health app keeps that information secure and private unless you purposefully share it. It integrates so well with the iPhone that it puts other smartwatches at a disadvantage — but that still means it has great support for iMessage, phone calls, Apple Music, and the rest. And for simple, basic smartwatch features like notifications and useful watch faces, watchOS 7 is second to none.

A small upgrade, but still the best smartwatch

12/26/2023

That's all true for the Apple Watch Series 6. But it's also true for any other modern Apple Watch. The second best smartwatch for iPhone users is the Apple Watch Series 5, followed closely by the Apple Watch SE and then the Apple

Watch 3.

I can't help but think that putting the Apple Watch into a yearly release cadence may not be strictly necessary anymore. Apple may keep making these small updates, but that doesn't mean you need to keep up with them. If you have an older Apple Watch that's still serving you in good stead, keep using it.

The Verge on YouTube / Exclusive first looks at new tech, reviews, and shows like Processor with Dieter Bohn.

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Agree to continue: Apple Watch Series 6

Every smart device now requires you to agree to a series of terms and conditions before you can use it – contracts that no one actually reads. It's inpossible for us to read and analyze every single one of these agreements. But we started counting exactly how many times you have to hit "agree" to use devices when we review them since these are agreements most people don't read and definitely can't neaotiate.

- Since the Apple Watch only works with the iPhone, you will already have consented to two mandatory agreements and (if you use Apple Pay), six optional ones.
- There is a terms and conditions agreement specifically for watchOS, which
 you can have emailed to you. Apple is transparent that many of the privacy
 settings you've chosen for your phone will transfer over to the Watch.

These agreements are mandatory, and you cannot negotiate them.

There are several more optional agreements:

- If you transfer your Apple Pay cards to work on the Watch, you may have
 to agree to additional terms from your bank. In my case, Bank of America
 includes a location sharing provision and provides a link (which you have to
 manually type out yourself) to a <u>PDF with more information</u>.
- If you set up cellular, you might have to agree to more terms from your carrier, but we couldn't test every one. Verizon, at least, didn't ask me to agree to additional terms, although it did ask for a \$30 activation fee.
- If you want to use blood oxygen monitoring, you must turn on location so that Apple can verify you live in an supported area. Similarly, emergency fall detection also will share your location whether or not you have it enabled in settings.

Final tally: one mandatory agreement, at least three optional agreements, and all the agreements necessary to use an iPhone.

MAS-ADD-578

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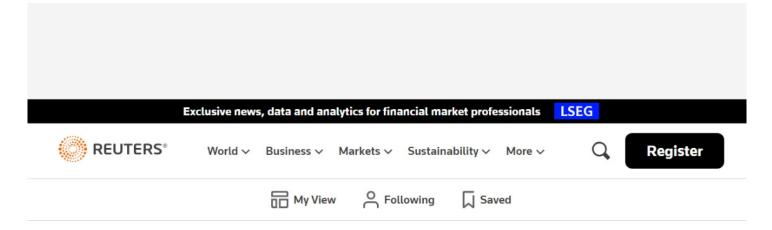




EXHIBIT 54

Video file submitted on a physical thumb drive

EXHIBIT 55



Litigation | Patent | Technology | Intellectual Property | Litigation

Apple lawsuits say health monitoring company Masimo copied Apple Watch

By Blake Brittain

October 20, 2022 3:06 PM PDT · Updated a year ago



An Apple Store employee shows the Series 5 Apple Watch in New York, September 19, 2019. REUTERS/Brendan McDermid Acquire Licensing Rights [*]

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Summary Related documents

- Masimo earlier accused Apple Watches of copying its own technology
- New Apple patent lawsuits say Masimo copied tech while seeking to ban competition

(Reuters) - Apple Inc sued medical technology company Masimo Corp in Delaware federal court on Thursday, accusing its new W1 line of smartwatches of infringing several Apple Watch patents.

The two lawsuits said Masimo copied Apple's technology while seeking bans on sales and imports of Apple Watches in earlier intellectual-property cases against the tech giant in California and at a U.S. trade tribunal. Apple said Masimo "carefully studied Apple's IP" during those cases and claimed a Masimo spinoff received confidential information about the Apple Watch.

Apple accused Masimo of trying to use the litigation to remove Apple's watches from the market to "make way for Masimo's own watch."

Irvine, California-based Masimo said in a statement that Apple's lawsuits are "retaliatory" and "appear to be an attempt to avoid the court in which the parties have been litigating their dispute for the past three years."

Masimo, which specializes in health-monitoring devices for medical patients, <u>sued</u> Apple in California federal court in 2020.

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The company said it met with Apple about integrating its technology into Apple products in 2013, and that Apple later hired away several of its employees. It accused Apple of infringing patents and stealing trade secrets related to the use of light sensors to measure biomarkers like heart rates and blood-oxygen levels.

Masimo also filed a complaint against Apple at the U.S. International Trade Commission last year over Apple Watch imports that allegedly violate its patent rights. Both of those cases are still ongoing.

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01/09/2024 https://www.reuters.com/legal/litigation/apple-lawsuits-say-health-monitoring-company-masimo-copied-apple-watch-2022-10-20/ Advertisement · Scroll to continue Apple countered in its new lawsuits that Masimo, which it said has "never been in the consumer wearables business," mimicked its technology to create the W1 line of smartwatches Masimo launched earlier this year. "Masimo, while trying to block importation or sale of Apple Watch, was also secretly copying it," Apple said. "By launching a device that copies Apple Watch and infringes our intellectual property, Masimo attempted to take advantage of our teams' many innovations," the company said in a statement. Advertisement · Scroll to continue

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well as four patents covering design elements of Apple Watches and chargers.

The cases are Apple Inc v. Masimo Corp, U.S. District Court for the District of Delaware, Nos. 1:22-cv-01377 and 1:22-cv-01378.

For Apple: John Desmarais and Peter Magic of Desmarais

For Masimo: attorney information not available

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Blake Brittain

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Blake Brittain reports on intellectual property law, including patents, trademarks, copyrights and trade secrets, for Reuters Legal. He has previously written for Bloomberg Law and Thomson Reuters Practical Law and practiced as an attorney. Contact: +12029385713

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EXHIBIT 56

Case 1:22-cv-01377-UNA Document 1 Filed 10/20/22 Page 1 of 32 PageID #: 1

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

APPLE INC.,

Plaintiff,

v.

Civil Action No.

MASIMO CORPORATION and SOUND UNITED, LLC,

Defendants.

JURY TRIAL DEMANDED

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Apple Inc. ("Apple"), for its complaint against Defendants Masimo Corporation ("Masimo") and Sound United, LLC ("Sound United") (together, "Defendants"), alleges as follows:

INTRODUCTION

- 1. Apple is world-renowned for creating innovative products that people love. Apple produces those innovative products through its significant investment in research and development in technology and product design. Apple's innovations have been recognized with thousands of patents globally.
- 2. In 2015, Apple released Apple Watch, a revolutionary consumer wearable device. Apple Watch pairs cutting-edge technology with a beautiful design and is made from the highest quality materials. As a result of Apple's investments and advances in consumer wearables, Apple Watch is the best-selling smart watch of all time. Apple protects these investments and advances through its intellectual property (IP) rights, including patents.

3. Masimo is a hospital equipment manufacturer that has never been in the consumer wearables business. But recently, Masimo released its first watch, direct to consumers, called the Masimo W1. Rather than innovating and developing a product independently, Masimo copied Apple while filing lawsuits to try to prevent sales of Apple Watch.



4. Masimo's copying violates Apple's patent rights. Apple brings this action to stop Masimo's infringement.

¹ See Company Evolution: About Masimo, MASIMO CORP., https://www.masimo.com/company/masimo/evolution/ (last visited Oct. 13, 2022).

G. That Apple be awarded enhanced damages pursuant to 35 U.S.C. § 284, and preand post-judgment interest at the maximum rate permitted by law;

- H. That this case be declared an exceptional case within the meaning of 35 U.S.C. § 285 and that Apple be awarded attorneys' fees, costs, and expenses incurred in connection with this action; and
 - I. That Apple be awarded such other relief as this Court deems just and appropriate.

DEMAND FOR JURY TRIAL

Pursuant to Federal Rule of Civil Procedure 38 and the Local Rules of this Court, Apple respectfully demands a jury trial on all issues so triable.

Dated: October 20, 2022 Respectfully submitted,

OF COUNSEL:

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By: /s/ David E. Moore

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Attorneys for Plaintiff Apple Inc.

EXHIBIT 57

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

APPLE INC.,

Plaintiff,

v.

Civil Action No.

MASIMO CORPORATION and SOUND UNITED, LLC,

Defendants.

JURY TRIAL DEMANDED

COMPLAINT FOR PATENT INFRINGEMENT

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3. Masimo is a hospital equipment manufacturer that has never been in the consumer wearables business. But recently, Masimo released its first watch, direct to consumers, called the Masimo W1. Rather than innovating and developing a product independently, Masimo copied Apple while filing lawsuits to try to prevent sales of Apple Watch.



4. Masimo's copying violates Apple's patent rights. Apple brings this action to stop Masimo's infringement.

¹ See Company Evolution: About Masimo, MASIMO CORP., https://www.masimo.com/company/masimo/evolution/ (last visited Oct. 13, 2022).

F. That this case be declared an exceptional case within the meaning of 35 U.S.C. § 285 and that Apple be awarded attorneys' fees, costs, and expenses incurred in connection with this action; and

G. That Apple be awarded such other relief as this Court deems just and appropriate.

DEMAND FOR JURY TRIAL

Pursuant to Federal Rule of Civil Procedure 38 and the Local Rules of this Court, Apple respectfully demands a jury trial on all issues so triable.

Dated: October 20, 2022 Respectfully submitted,

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EXHIBIT 58

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| | UNITED STATES DISTRICT COURT | | | |
| 2 | CENTRAL DISTRICT OF CALIFORNIA - SOUTHERN DIVISION | | | |
| 3 | HONORABLE JAMES V. SELNA, U.S. DISTRICT JUDGE | | | |
| 4 | MASIMO CORPORATION, et al., | | | |
| 5 | Plaintiffs,) Certified Transcript | | | |
| 6 7 | vs.) Case No.) SACV-20-00048-JVS | | | |
| · | APPLE INC., | | | |
| 8 | Defendant.) Day 11, VOLUME II | | | |
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| 11 | | | | |
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| 13 | UNDER SEAL REPORTER'S TRANSCRIPT OF PROCEEDINGS | | | |
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| 14 | JURY TRIAL WEDNESDAY, APRIL 19, 2023 | | | |
| 15 | 1:20 P.M. SANTA ANA, CALIFORNIA | | | |
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              DIEDRE CALDBECK
11
              Corporate Representative (Apple)
12
13
14
15
16
17
18
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23
24
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| | | | |

1 MR. JENSEN: May I proceed? 2 THE COURT: Please. STEPHEN WAYDO, PREVIOUSLY SWORN, RESUMES THE STAND 3 4 **CROSS-EXAMINATION** BY MR. JENSEN: 01:33PM 5 Good afternoon, Dr. Waydo. My name is Steve Jensen, and 7 I'm one of Masimo's lawyers. I'll be asking you some questions 8 today. I think we've got some binders. I'd just like to start where you -- I'd like to start where you left off before lunch. 01:34PM 10 You had talked quite a bit about Apple's dark channel subtraction. 11 12 Do you have that in mind? 13 A Yes. And your defense counsel put dots up here on D1, D3, and 14 01:34PM 15 D10. 16 Do you remember that? I think so. 17 A Yeah. And nobody has suggested to you that Apple's dark 18 channel subtraction uses any of Masimo's trade secrets, have 19 they? 01:34PM 20 21 Α No. And you did not talk about any of the patents over on 22 23 this side of the board, did you? A I did not. 2.4 01:34PM 25 And in fact, you weren't involved in any of the Q

```
1
                Correct.
          Α
       2
                But it is why you supported releasing the blood oxygen
          feature; correct?
       3
          Α
                No.
01:44PM
      5
               Okay. Can you find Exhibit 736 in your book?
       6
          Α
                Okay.
       7
                And this is an email between you and Xiao Jin dated
          March 17th, 2020; correct?
       9
          Α
                Yes.
01:45PM 10
                      MR. JENSEN: And I'd move to admit, Your Honor,
          Exhibit 736.
      11
      12
                      MS. GARCIA: No objection.
      13
                      THE COURT: 736 will be received.
                      (Exhibit Number 736 received.)
      14
01:45PM 15
                BY MR. JENSEN: And do you see down towards the bottom of
      16
          the first page, it's -- there's a paragraph that starts with
      17
          "However"?
      18
          Α
                Yes.
      19
                Okay. And Xiao Jin wrote:
                      "There are comments that say they would buy
01:45PM 20
                an Apple watch if the rumor of blood oxygen feature
      21
      22
                is real, and some say they would switch from Apple
      2.3
                watch if that is" -- "switch from Fitbit," I
                think -- "switch from Fitbit to Apple watch if that
      2.4
                is true, especially during the chaos of COVID-19
01:45PM 25
```

1 and many are looking into buying blood oxygen 2 monitoring device." 3 Do you see that? 4 Α Yes. And Apple did move forward and release the pulse oximetry 01:46PM 5 feature in September 2020; correct? Α Yes. And that was during the middle of the COVID pandemic? 9 Α Yes. 01:46PM 10 And Apple expects that the Apple watch will be used by Q. 11 many people in the medical context; correct? 12 We can't control how people use it. It's not regulated as Α 13 a medical device. But people use it how they choose. 14 But you do expect they will use it that way; correct? 01:46PM 15 Some people are likely to. 16 Okay. And we talked a little bit about demodulation 17 earlier, and you are still -- isn't it true that Apple is still 18 exploring adding some additional demodulation --19 modulation/demodulation approaches in the Alder hardware; 01:46PM 20 correct? 21 Α Yes. That are different from the prior ones; correct? 22 2.3 That's correct. 2.4 MR. JENSEN: No more are questions, Your Honor. THE COURT: Ms. Garcia? 01:47PM 25

```
1
                     CERTIFICATE OF OFFICIAL REPORTER
 2
 3
    COUNTY OF LOS ANGELES
 4
    STATE OF CALIFORNIA
                   I, DEBBIE HINO-SPAAN, FEDERAL OFFICIAL REALTIME
 5
    COURT REPORTER, in and for the United States District Court for
 6
 7
    the Central District of California, do hereby certify that
 8
    pursuant to Section 753, Title 28, United States Code that the
 9
    foregoing is a true and correct transcript of the
10
    stenographically reported proceedings held in the
11
    above-entitled matter and that the transcript page format is in
12
    conformance with the regulations of the Judicial Conference of
13
    the United States.
14
15
    Date: April 19, 2023
16
17
18
19
                                   /S/ DEBBIE HINO-SPAAN
20
                                 Debbie Hino-Spaan, CSR No. 7953
                                 Federal Official Court Reporter
21
22
23
24
25
```

EXHIBIT 59

```
1
 2
 3
 4
                      UNITED STATES DISTRICT COURT
 5
                     CENTRAL DISTRICT OF CALIFORNIA
 6
                             SOUTHERN DIVISION
 7
 8
           THE HONORABLE JAMES V. SELNA, JUDGE PRESIDING
 9
             MASIMO CORPORATION, et al., ) CERTIFIED TRANSCRIPT
                               Plaintiffs, )
10
                VS.
                                           ) SACV-20-00048-JVS
11
             APPLE, INC.,
12
                              Defendant. )TRIAL DAY 12, VOL. I
              _____)
13
                                                (UNDER SEAL)
14
15
               REPORTER'S TRANSCRIPT OF PROCEEDINGS
16
                       Santa Ana, California
17
                           April 20, 2023
18
19
                            SHARON A. SEFFENS, RPR
                            United States Courthouse
20
                            411 West 4th Street, Suite 1-1053
                            Santa Ana, CA 92701
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22
23
24
25
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SHARON A. SEFFENS, U.S. DISTRICT COURT REPORTER

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SHARON A. SEFFENS, U.S. DISTRICT COURT REPORTER

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     ALSO PRESENT:
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     DIEDRE CALDBECK
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 6
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SHARON A. SEFFENS, U.S. DISTRICT COURT REPORTER

| 7 | |
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| 71 | |
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| 1 | | | | | |
|----|--|--------|-------|----------|----------------|
| 2 | I-N-D-E-X | | | | |
| 3 | PLAINTIFFS' WITNESSES: | DIRECT | CROSS | REDIRECT | RECROSS |
| 4 | STEVEN HOTELLING | 9 | 20 | 27 | 29 |
| 5 | PLAINTIFFS' | | | | |
| 6 | EXHIBITS: | | | MARKED | RECEIVED |
| 7 | Exhibit 2070 Exhibit 165 | | | | 12 15 |
| 8 | DEFENSE | | | | |
| 9 | WITNESSES: | DIRECT | CROSS | REDIRECT | RECROSS |
| 10 | STEVEN WARREN | 30 | 101 | | |
| 11 | DEFENSE EXHIBITS: | | | MARKED | RECEIVED |
| 12 | Exhibit 3778 | | | | 49 |
| 13 | Exhibit 3887 | | | | 57 |
| 14 | Exhibit 3879 Exhibit 184 Exhibit 3800 | | | | 60 85 88 |
| 15 | Exhibit 3808 Exhibit 4232 Exhibit 3003 | | | | 89 93 |
| 16 | Exhibit 3003 | | | 93 | |
| 17 | | | | | |
| 18 | | | | | |
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| 24 | | | | | |
| 25 | | | | | |
| | | | | | |

SHARON A. SEFFENS, U.S. DISTRICT COURT REPORTER

```
have to take a witness out of order for scheduling reasons,
         1
09:08
         2
             so Mr. Hotelling will be coming back today to complete his
09:08
             testimony and Dr. Madisetti will be testifying. You are not
09:08
         3
         4
             to give any significance to the fact that we haven't done
09:08
             this in a perfect world.
09:08
                       MR. MUELLER: Ms. Wigmore will conduct the
         6
09:08
             examination.
09:08
                       THE COURT: Mr. Jensen.
09:08
        8
        9
                       MR. JENSEN: Yes, I will proceed, Your Honor. We
09:08
        10
             have books. If we could distribute those, Your Honor.
09:08
                 STEVEN PORTER HOTELLING, PLAINTIFFS' WITNESS, SWORN
09:09
        11
        12
                       THE CLERK: If you could please state your full
09:09
        13
             name, spelling your first and last name for the record.
09:09
        14
                       THE WITNESS: Steven Porter Hotelling, S-t-e-v-e-n
09:09
        15
             P-o-r-t-e-r H-o-t-e-l-l-i-n-q.
09:09
        16
                       THE COURT: Mr. Jensen.
09:09
                                   DIRECT EXAMINATION
09:09
        17
09:09
        18
             BY MR. JENSEN:
09:09
        19
                  Welcome back, Mr. Hotteling. We have a few additional
09:09
        20
             questions.
        21
                       Last week we discussed Project Rover, a project
09:09
        22
             you oversaw at Apple. Do you remember that discussion?
09:09
        23
                  Yes, I do.
09:10
             Α
        24
                  We looked at a Rover presentation. It's Exhibit 260 in
09:10
        25
             your binder. We have already looked at it, and it's already
09:10
```

SHARON A. SEFFENS, U.S. DISTRICT COURT REPORTER

```
But shortly after, Apple did pursue a confidential
         1
09:13
         2
             project on recruiting from Masimo and Cercacor, correct?
09:13
                  We were recruiting from -- I don't remember that it was
09:13
         3
         4
             particularly confidential other than any of our other
09:13
             recruiting. We were recruiting from them as well as other
09:13
         6
             companies in general.
09:13
                  Let's turn to 2070 in your binder.
09:13
         8
                  Okay. 2070, yes.
09:13
             Α
        9
                  And this is an e-mail chain between you and Lan Nguyen
09:13
             with the last date ends up being December 4, 2013, correct?
        10
09:13
                  Yes, the top e-mail here is December 4, 2013.
09:14
        11
             Α
        12
                  And it's an e-mail chain between you and Lan Nguyen?
09:14
        13
                  Yes, that's correct.
09:14
                       MR. JENSEN: Your Honor, I would move for
        14
09:14
        15
             admission of Exhibit 2070.
09:14
        16
                       MS. WIGMORE: No objection other than those issues
09:14
09:14
        17
             we are already discussed.
09:14
        18
                        THE COURT: 2070 will be received.
                        (Exhibit 2070 received in evidence)
09:14
        19
09:14
        20
             BY MR. JENSEN:
        21
                  The subject of this e-mail is recruiting from Masimo,
09:14
        22
             correct? Do you see that at the top?
09:14
        23
                  Yes, I do.
09:14
             Α
        24
                  And the earliest e-mail we see is from October 22,
09:14
        25
             2013. Do you see that on the second page?
09:14
```

SHARON A. SEFFENS, U.S. DISTRICT COURT REPORTER

```
1
             A
                  Yes, I do.
09:14
         2
             Q
                  That's just a little under a week from the date of the
09:14
             Project Everest presentation you just looked at, correct?
09:14
         3
         4
             Α
                  Yes, that's correct.
09:14
                  If you would please turn to that earlier e-mail that we
09:14
         6
             were just looking at, the e-mail points out that Apple had a
09:15
             research team that needed a couple of weeks to get the
09:15
         8
             project done. Do you see that? "Our research team needs a
09:15
         9
             couple of weeks to get this done?"
09:15
        10
                  Yes, I see that.
09:15
                  At this point, you had already hired Masimo's chief
09:15
        11
        12
             medical officer, correct?
09:15
        13
                  Apple had hired Dr. O'Reilly, yes.
09:15
        14
                  And Apple was in discussions with Cercacor's chief
09:15
        15
             technical officer, correct?
09:15
        16
                  I'm trying to remember the date when Dr. Lamego reached
09:15
             Α
09:15
        17
             out. It was definitely in October, so that could be true.
09:15
        18
                  According to this e-mail from Lan Nguyen, the research
09:15
        19
             team was working on "the next level down as discussed." Do
09:15
        20
             you see that?
        21
             Α
                  Yes, I do.
09:15
                  And just above that in the e-mail, you asked Lan to
        22
09:16
        23
             expedite the research, correct?
09:16
        24
                  Yes, I do.
             Α
09:16
        25
                  And then if you would turn to the previous page, the
09:16
```

SHARON A. SEFFENS, U.S. DISTRICT COURT REPORTER

```
research team responded that they would have the research
         1
09:16
         2
             ready by the end of the week, correct?
09:16
         3
09:16
             Α
                  Yes.
         4
                  At least a small portion of the research ready to
09:16
09:16
             review by the end of the week; is that correct?
         6
                  Yes.
09:16
             Α
                  So by my calculation, that means by early November you
09:16
         8
             were getting results about Masimo and Cercacor employees
09:16
        9
             from the recruiting research team at Apple, correct?
09:16
        10
                  I don't remember when we got results from this
09:16
             information.
09:16
        11
        12
                  Please look at the next e-mail in the chain that was
09:16
        13
             sent on December 3. That e-mail points out that the last
09:16
        14
             phase was ready for review by your team, correct?
09:16
        15
                  Yes, that's correct.
09:17
        16
                  And it says: "I have the last phase of this
09:17
             confidential project ready to present to you and Myra,"
09:17
        17
09:17
        18
             correct?
09:17
        19
             Α
                  Yes.
09:17
        20
                  You did continue to schedule meetings about recruiting
        21
             from Masimo into December 2013, correct?
09:17
        22
             Α
                  Yes, I mean as we do with many companies.
09:17
        23
                  Would you please find Exhibit 165 in your binder?
09:17
        24
             Α
                  Okay.
09:17
        25
                  This is an e-mail sent to you on March 21, 2014.
09:17
```

SHARON A. SEFFENS, U.S. DISTRICT COURT REPORTER

```
1
             is now after Dr. Lamego was with Apple, correct?
09:17
         2
             Α
                  Yes, I see it.
09:17
                  It's an e-mail from Dr. Lamego to you?
09:17
         3
                 Yes, correct.
09:18
         4
             Α
                       MR. JENSEN: Your Honor, I would move to admit
09:18
             Exhibit 165.
         6
09:18
                       MS. WIGMORE: No objection other than our prior
09:18
       8
             discussion.
09:18
                       THE COURT: 165 will be received.
09:18
                        (Exhibit 165 received in evidence)
        10
09:18
             BY MR. JENSEN:
09:18
        11
        12
                  Do you see on the first page Marcelo Lamego sent an
09:18
        13
             e-mail about Johannes Bruinsma? Do you see that?
09:18
        14
             Α
                  Yes.
09:18
        15
                  He says in about the middle of the page: "Johannes
09:18
        16
             would bring value to the sensing team because of following
09:18
             reasons." Do you see that?
09:18
        17
09:18
        18
             Α
                  Yes.
09:18
        19
                  He explained below that in Item No. 1: "He brings to
09:18
        20
             the company immediate experience as far as the development
        21
             and test of ultra-low-noise HW systems for fitness and
09:18
        22
             wellness sensors," correct?
09:18
        23
                  Yes, that's correct.
09:18
        24
                  "The same could be accomplished by training some of the
09:18
        25
             new hires. However, it will take some time until they are
09:19
```

SHARON A. SEFFENS, U.S. DISTRICT COURT REPORTER

```
1
             are on par to the exclusive knowledge and experience
09:19
         2
             Johannes was exposed to while working on my team in the
09:19
         3
             past," correct?
09:19
         4
             Α
                  That's correct.
09:19
09:19
                  You understood that team was at Cercacor, correct?
         6
                  I don't remember this e-mail. I know now certainly
09:19
             that this relates to Johannes who worked for Dr. Lamego.
09:19
         8
             Therefore, they were at Cercacor, but I don't remember it
09:19
             from that time.
         9
09:19
                  You do know that Apple ultimately hired Johannes to
        10
09:19
             work at Apple, right, Johannes Bruinsma?
09:19
        11
        12
                  The name is familiar. I believe that's probably
09:19
        13
09:19
             correct.
        14
                  Let's see if I can refresh your recollection. I would
09:19
        15
             like you to look in your binder at Exhibit 1786, which is
09:19
        16
             Apple's official fifth -- I would like you to find the Fifth
09:20
09:20
        17
             Supplemental Response Interrogatory No. 11 in the case, and
09:20
        18
             I will actually have you turn to page 26.
                  Is this 1786.1?
09:20
        19
             Α
09:20
        20
                  1786.1. Sorry.
        21
             Α
                  Sorry, which page?
09:20
        22
                  The fifth supplemental response starts on page 25.
09:20
        23
             you see down at the bottom it says "Fifth Supplemental
09:20
        24
             Response"?
09:20
        25
                  Yes, I do.
09:20
```

SHARON A. SEFFENS, U.S. DISTRICT COURT REPORTER

```
1
                  If you would turn the page, there is a heading at the
09:20
         2
             bottom of page 26 entitled: "Employees who worked at
09:20
             plaintiffs prior to working at Apple." do you see that?
09:20
         3
         4
             Α
                  I do see this.
09:21
                  Then on the right-hand side, there is a chart with
09:21
         6
             quite a number of people on it. Do you see that chart?
09:21
                  Yes, I do.
09:21
             Α
                  And in addition to Marcelo Lamego and Michael O'Reilly,
09:21
         8
             there is quite a number of people that were hired to work at
         9
09:21
        10
             Apple that previously worked at Masimo or Cercacor, correct?
09:21
09:21
        11
                  I'm sorry. I'm seeing this for the first time.
        12
             this a document from Apple?
09:21
        13
                  This is a response to an interrogatory from Apple, yes.
09:21
        14
                  Okay. Yes, I see the list here.
09:21
        15
                  I would like to focus on certain of those employees and
09:21
        16
             just see if this refreshes your recollection as to some of
09:21
09:21
        17
             those that were hired for the watch team. If you would turn
09:21
        18
             the page, you will see "Employees work on watch." Do you
09:21
        19
             see that?
09:21
        20
             Α
                  I do see that.
        21
                  And Marcelo Lamego, we have talked about quite a bit in
09:21
        22
             this case, so we know about him, correct?
09:21
        23
             Α
09:22
                  Yes.
        24
                  And if you would turn the page to page 30, we have
09:22
        25
             Dr. Michael O'Reilly, and we know quite a bit about him.
09:22
```

SHARON A. SEFFENS, U.S. DISTRICT COURT REPORTER

```
1
             has been talked about quite a bit in this case?
09:22
         2
             Α
                   Yes.
09:22
         3
                   And then it lists Johannes Bruinsma, the person we just
09:22
         4
             talked about?
09:22
09:22
                  Yes, I see that.
         6
                  You see he worked on the ECG feature for the Apple
09:22
             Watch.
09:22
09:22
         8
             Α
                  Yes.
        9
                  That would be within your team?
             Q
09:22
                   That's correct. That would be within the health
        10
09:22
             sensing hardware team.
09:22
        11
09:22
        12
                   Inje Lee is the next person?
        13
                   I see that.
09:22
                  And he was involved in a design of studies related to
        14
09:22
        15
             Apple Watch including desaturation studies and oxygen
09:22
             saturation studies?
        16
09:22
                   I have no independent memory of that, but I do see what
09:22
        17
             Α
09:23
        18
             it says here on the page.
09:23
        19
             Q
                   Does that fall within your team?
09:23
        20
                  No, the studies do not fall within my team.
        21
                  Maybe that will be the case for the next person Haritha
09:23
        22
             Haridas who worked on clinical trials involving Apple
09:23
        23
             products and technology. Do you see that?
09:23
        24
                  I see that.
             Α
09:23
        25
                  Does she work on your team?
09:23
```

SHARON A. SEFFENS, U.S. DISTRICT COURT REPORTER

| 09:23 | 1 | A She did not work on my team. |
|-------|----|---|
| 09:23 | 2 | Q How about Matt Hall who worked on core fitness and |
| 09:23 | 3 | certain sensor features of the Apple Watch including the |
| 09:23 | 4 | accelerometer and gyroscope? Did that person work on your |
| 09:23 | 5 | team? |
| 09:23 | 6 | A Uncertain. The core motion team is not part of my |
| 09:23 | 7 | team. However, the motion sensing hardware team is part of |
| 09:23 | 8 | my team. |
| 09:23 | 9 | Q Cornelius Raths working on technology worked on Apple |
| 09:23 | 10 | Watch directed to sleep monitoring, sleep detection, and |
| 09:23 | 11 | sleep-related pathologies? |
| 09:23 | 12 | A Yes, I see that. I don't have any memory of Cornelius |
| 09:24 | 13 | Raths. |
| 09:24 | 14 | Q Do you doubt that Apple hired all of those people to |
| 09:24 | 15 | work on the Apple Watch? |
| 09:24 | 16 | A No, no. As you said this is from Apple, so I believe |
| 09:24 | 17 | this must be correct. |
| 09:24 | 18 | Q So the confidential project we talked about in |
| 09:24 | 19 | Exhibit 2070 that started immediately after Project Everest |
| 09:24 | 20 | netted quite a few employees from Masimo and Cercacor, |
| 09:24 | 21 | correct? |
| 09:24 | 22 | A It is true that some of these people may have come from |
| 09:24 | 23 | that project. It could also be true that some of these |
| 09:24 | 24 | people may have come before that or independent of that. |
| 09:24 | 25 | Q But you ended up with quite a few employees from Masimo |

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1
             and Cercacor, correct?
09:24
         2
                  I would say -- I mean, it's accurate that these people
09:24
         3
             joined Apple as stated here by Apple, although not unusual
09:24
         4
             for people from other companies to join Apple or vice-versa.
09:25
09:25
                       MR. JENSEN: No further questions, Your Honor.
         6
                       THE COURT: Ms. Wigmore.
09:25
                       MS. WIGMORE: Your Honor, may I proceed?
09:25
                       THE COURT:
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         8
                                   You may.
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                                    CROSS-EXAMINATION
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             BY MS. WIGMORE:
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                  Welcome back, Mr. Hotelling.
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        12
                        We handed you a binder, and I believe the
09:25
        13
             documents in there may be duplicative of the binder Mr.
09:25
        14
             Jensen gave you, so you can use either one as you see fit.
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        15
                        I want to start with Exhibit 263. That's Tab 1 in
09:25
             the binder you were just handed, but that exhibit also
        16
09:25
09:25
        17
             appears in the Jensen binder.
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        18
                        This is the Project Everest slide deck that you
09:26
        19
             testified about on your direct examination last week. Do
09:26
        20
             you recall that?
        21
             Α
                  Yes, I do.
09:26
        22
                  If we could turn please to page 18 which is Bates
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        23
             No. 776, do you recall Mr. Jensen calling your attention to
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             this slide? I will give you a chance to get to it.
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             Α
                  Yes, I do.
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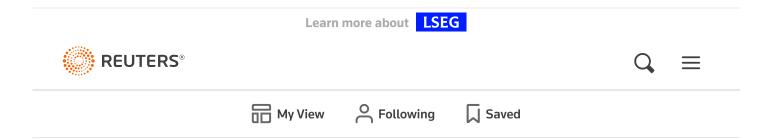
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EXHIBIT 60

1/9/24, 7:14 PM

Apple to halt US sales of Series 9, Ultra 2 smartwatches over patent dispute | Reuters



Technology

Apple to halt US sales of Series 9, Ultra 2 smartwatches over patent dispute

By Samrhitha A, Stephen Nellis and Blake Brittain

December 18, 2023 8:43 PM PST · Updated 22 days ago



00:00 / 01:13

Dec 18 (Reuters) - Apple (AAPL.O) said on Monday it would pause sales of its Series 9 and Ultra 2 smartwatches in the United States from this week, as it deals with a patent dispute over the technology that enables the blood oxygen feature on the devices.

1/9/24, 7:14 PM

Apple to halt US sales of Series 9, Ultra 2 smartwatches over patent dispute | Reuters

The move comes after an <u>order in October</u> from the U.S. International Trade Commission (ITC) that could bar Apple from importing its Apple Watches after finding the devices violate medical technology company Masimo's (MASI.O) patent rights.

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The decision is under review by President Joe Biden until Dec. 25, but Apple said it is taking steps to comply should the ruling stand. The Office of the U.S. Trade Representative, the part of the Biden administration handling the case, said that Ambassador Katherine Tai "is carefully considering all factors in this case."

If not vetoed, the ban would go into effect on Dec. 26.

The company said it would pause sales of the watches from its website starting on Dec. 21 and from Apple retail locations after Dec. 24. Other models that do not contain the blood oxygen sensor, like Apple's lower-priced Apple Watch SE model, are unaffected by the dispute.

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Apple to halt US sales of Series 9, Ultra 2 smartwatches over patent dispute | Reuters

Ryan Reith, program vice president for research firm IDC's mobile device tracking efforts, said that U.S. holiday sales of Apple Watches will not suffer and that the full impact of the ruling, if it stands, will come in January and February, typically some of Apple's slowest sales months in the U.S.

"Apple has plenty of inventory of Watch 8 and SE so they will have products available during that time," Reith said. "The bigger implication is around whether or not Apple can use the blood oxygen sensor technology that is in question on future devices, or if they'll have to reach a settlement or come up with a new solution."

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Masimo CEO Joe Kiani told CNBC in October that he was open to negotiating a deal with Apple. In a statement on Monday, Masimo said the ITC decision "should be respected, protecting intellectual property rights and maintaining public trust in the United States' patent system and encouraging US industry."

Apple has about a quarter of the global smartwatch market, according to Counterpoint Research - a share that tends to rise to more than a third in the fourth quarter during the U.S. and European holiday sales seasons. Both the Series 9 and the Ultra 2 would remain available for purchase outside of the United States, including during the Lunar New Year season in Asia.

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Apple said it believes the ITC's finding was erroneous, should be reversed and that it intends to appeal the decision to the Federal Circuit.

Apple shares closed 0.9% lower on Monday.



New Apple Watches Series 9 are displayed during the 'Wonderlust' event at the company's headquarters in Cupertino, California, U.S. September 12, 2023. REUTERS/Loren Elliott/File Photo <u>Acquire Licensing Rights</u>

Apple to halt US sales of Series 9, Ultra 2 smartwatches over patent dispute | Reuters

Masimo has accused Apple of hiring away its employees, stealing its pulse oximetry technology and incorporating it into the popular Apple Watch.

A jury trial on Masimo's allegations in California federal court ended with a mistrial in May. Apple has separately sued Masimo for patent infringement in a federal court in Delaware and has called Masimo's legal actions a "maneuver to clear a path" for its own competing smartwatch.

The U.S. Patent and Trademark Office rejected Apple's requests to review the validity of the patents at issue in the ITC decision earlier this year.

Engineers at Apple are moving to make changes to algorithms in the smartwatches, adjusting how the technology determines oxygen saturation and presents the data to customers, Bloomberg reported on Monday, citing people familiar with the work.

Apple is working on a range of legal and technical options, if the ban holds. It has begun preparing stores for the change, sending new signs to its retail outlets that promote the Apple Watch without showing photos of the Series 9 and Ultra 2 — two models targeted by the ban, the report added.

An Apple spokeswoman told Bloomberg that the company is working on submitting a workaround to the U.S. customs agency, which is in charge of approving changes to get a product back on the market.

"The patents in question cover hardware. Masimo believes that Apple needs to change the hardware," a Masimo spokesperson told Reuters about the Bloomberg report, while Apple did not respond to a request for comment.

Apple did not comment on Bloomberg's report but earlier on Monday said it was working on "technical options" to ensure Apple Watches are available to customers and that it would "take all measures" to get the devices back to shelves if the ITC order stands.

A presidential administration has not vetoed an ITC ruling since 2013, when President Barack Obama's administration overturned an import ban on Apple's iPhones and iPads from a patent dispute with Samsung.

The Biden administration in February chose not to veto a separate import ban on Apple Watches based on a patent-infringement complaint from medical technology company AliveCor. The ITC has placed the ban on hold for other reasons.

Apple's wearables, home and accessory business, which includes the Apple Watch, AirPods earbuds and other products, brought in \$8.28 billion in revenue during the third quarter of 2023, according to a company report.

Reporting by Samrhitha Arunasalam in Bengaluru, Blake Brittain in Washington and Stephen Nellis in San Francisco; Additional reporting by Juby Babu in Bengaluru Editing by Anil D'Silva, Deepa Babington and Matthew Lewis

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Blake Brittain reports on intellectual property law, including patents, trademarks, copyrights and trade secrets, for Reuters Legal. He has previously written for Bloomberg Law and Thomson Reuters Practical Law and practiced as an attorney. Contact: +12029385713







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Technology · January 9, 2024 · 7:40 AM PST

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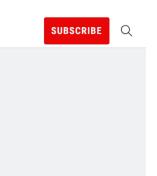
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01/04/2024

= TIME

https://time.com/6548950/apple-watch-ban-us-masimo/

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BUSINESS • COMPANIES

Apple Scrambles to Tweak Its Watches in Face of Looming U.S. Ban



BY MARK GURMAN / BLOOMBERG

UPDATED: DECEMBER 19, 2023 8:00 AM EST | ORIGINALLY PUBLISHED: DECEMBER 18, 2023 10:30 PM EST

A pple Inc., just days away from a U.S. ban of its smartwatches, is plotting a rescue mission for the \$17 billion business that includes software fixes and other potential workarounds.

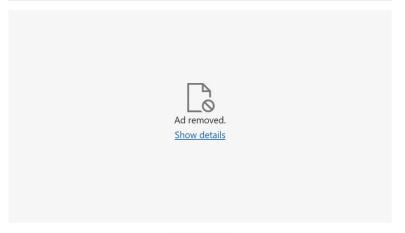
Engineers at the company are racing to make changes to algorithms on the device that measure a user's blood oxygen level — a feature that Masimo Corp. has argued infringes its patents. They're adjusting how the technology determines oxygen saturation and presents the data to customers, according to people familiar with the work.

It's a high-stakes engineering effort unlike any Apple has undertaken before. Though the iPhone maker's products have previously been barred in certain countries over legal disputes, this restriction would hit one of Apple's biggest moneymakers in its home country — on Christmas no less. Without a last-minute veto by the White House, a ban imposed by the International Trade Commission will take effect on Dec. 25.

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Apple could settle with Masimo, though that's a route it typically prefers not to take. And the two companies don't appear to have engaged on that front. For now, Apple is focused on modifying its technology and trying to win favor with regulators.



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BY KIA

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If the ban holds, Apple is working on a range of legal and technical options. Already, it's begun preparing stores for the change. It sent new signs to its retail outlets that promote the Apple Watch without showing photos of the Series 9 and Ultra 2 — two models targeted by the ban. The company's lowerend SE watch will still be available.

Apple plans to stop selling the prohibited watches on its website on Thursday and then pull them from its roughly 270 brick-and-mortar outlets by Dec. 24.

The news sent Apple's stock down less than 1% on Monday. Shares were virtually unchanged in pre-market trading on Tuesday at \$196. Masimo shares gained 3.2% on Monday.

In a statement, Masimo said the decision to ban the Apple Watch models "demonstrates that even the world's most powerful company must abide by the law."

Work within Apple suggests that the company believes software changes — rather than a more complicated hardware overhaul — will be enough to bring the device back to store shelves. But the patents at the heart of the dispute are mostly related to hardware, including how light is emitted into the skin to measure the amount of oxygen in a person's blood.

An Apple spokeswoman said the company is working on submitting a workaround to the U.S. customs agency, which is in charge of approving changes to get a product back on the market.

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Masimo has said that a software fix will be an insufficient remedy. "The hardware needs to change," the maker of medical devices said.

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The ITC ban will take the form of an import restriction that makes it impossible for Apple to sell the device in the U.S. The company relies on overseas suppliers for the watch's components and its assembly.

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Such disputes are typically settled before they get to this point, said Evan Zimmerman, co-founder and chief executive officer of Edge, which makes software for drafting patents.

"These types of disputes that lead to import restrictions are rare and are often used as leverage in settlement negotiations," he said. It may be a challenge for Apple to resolve the dispute with software tweaks, given how broad Masimo's patents are, Zimmerman said. But Apple could make a plausible argument that the software controls how the device works, he said.

While the company is working on both hardware and software fixes, actually getting the new technology to market will take time. Apple's internal software testing process is lengthy, for good reason. The company needs to ensure that any changes won't break other smartwatch features. The adjustments also may need additional testing given their medical purpose.

In a scenario where Apple needs to remove hardware from its device, getting new models produced and shipped could take at least three months, according to one person familiar with the company's operations. And that doesn't account for how long it will take the customs agency to approve the move.

The blood-oxygen feature was first added to the Apple Watch in 2020 with the Series 6 model. At the time, the coronavirus pandemic was raging and some doctors used blood-oxygen levels to assess the impact of the virus on patients' ability to breathe.

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The feature monitors a person's levels throughout the day. A user also can get a current reading, which takes about 15 seconds. Many patients seek levels between 95% and 100%.

The capability was also included on the Apple Watch Series 7 and Series 8. Apple stopped selling the Series 7 when new models were released, but the Series 8 remains available as a refurbished device. If the ban takes effect, those sales will need to stop as well.

The ITC ban only applies to Apple's direct sales channels, so third-party retailers like Walmart Inc., Best Buy Co. and Target Corp. can continue offering the device. Walmart and Best Buy both said Monday that they don't plan to stop.

Apple has increasingly used health and safety features to market its smartwatches, helping turn the lineup into a major growth driver in recent MAS-ADD-644

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years. Analysts estimate that it generated \$16.9 billion in revenue for Apple in fiscal 2023, up from \$9.1 billion annually five years ago.

Though that's a fraction of the \$200 billion generated by the iPhone, the watch also helps keep people locked into the Apple ecosystem.

It's unclear if the White House will ultimately grant Apple a reprieve. An administration official said that U.S. Trade Representative Katherine Tai is handling the review and carefully considering all factors in the dispute.

The White House has the power to veto ITC decisions, and the Obama administration did just that with a ban of the iPhone in 2013 in the U.S. But that ruling stemmed from a patent fight with South Korea-based Samsung Electronics Co. Masimo is located in Irvine, California, which means the government would have to pick one U.S. company over another.

In its statement, Masimo said the ITC decision followed a thorough legal process and "should be respected."

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EXHIBIT 62

TECHNOLOGY

Apple Appeals U.S. Ban That Halted Watch Sales

Federal trade agency's ruling forced iPhone maker to stop selling two most popular watch models

By Joseph Pisani (Follow)

Updated Dec. 26, 2023 3:21 pm ET

Apple AAPL -3.70% ▼ is appealing a decision by a federal trade agency that forced it to stop selling two models of its smartwatches after the agency said Apple violated patents of a competitor.

Apple said in court documents filed Tuesday the company will suffer "irreparable harm" if the ban stays in place, since the models are its two most popular. The watch models affected are its newest ones: the Apple Watch Series 9 and the Apple Watch Ultra 2.

The iPhone maker asked the court to allow it to sell the watches while it considers Apple's appeal.

The U.S. International Trade Commission ruled in October that Apple violated patents related to a blood-oxygen sensor on some versions of the device and ordered the import ban.

The Biden administration declined to overturn the ITC's decision, which became final on Tuesday. U.S. Trade Representative Katherine Tai said she declined to reverse the order "after careful consultations."



Apple smartwatches on display at a store in Texas. PHOTO: ADAM DAVIS/SHUTTERSTOCK

Apple said Tuesday it disagrees with the agency's decision and is taking measures to restart watch sales to U.S. customers as soon as possible. Apple stopped selling the watches online on Dec. 21 and in U.S. stores on Tuesday.

The SE, an older model that wasn't part of the ruling, is still for sale. All Apple watches are still available outside of the U.S.

Apple is seeking approval from U.S. Customs and Border Protection, the federal agency responsible for enforcing import bans, for redesigned versions of the two watch models subject to the restriction. The technical fix would presumably allow the watches to be sold in the U.S. again. The details of the redesign are redacted in the legal filing.

Apple said the Customs office is scheduled to decide on Jan. 12 whether Apple's changes would be sufficient. The company said in the filing, in the U.S. Court of Appeals for the Federal Circuit, that sales should be allowed to continue at least until that decision is made. The Federal Circuit reviews certain agency decisions, including those from the ITC.

The case revolves around medical-technology company Masimo MASI -1.32% ▼, which alleged in a 2021 complaint that Apple violated its patents. Apple has included a sensor, called a pulse oximeter, in most new models of the Apple Watch since 2020.

Apple has said it doesn't steal technology and accused Masimo of copying it.

A Masimo spokesman said the ITC's decision was a win for the integrity of the U.S. patent system and American consumers.

Apple is the largest seller of smartwatches, accounting for nearly 60% of global sales, according to Counterpoint Research. Still, the watches made up only about 4.7% of Apple's overall sales of about \$383 billion in fiscal 2023, estimated investment firm Oppenheimer.

—Aaron Tilley contributed to this article.

Write to Joseph Pisani at joseph.pisani@wsj.com

Appeared in the December 27, 2023, print edition as 'Apple Appeals U.S. Ruling'.

EXHIBIT 63

1/9/24, 9:57 AM

How an email from an Irvine engineer to Tim Cook set Apple Watch saga in motion - Orange County Register

BUSINESS • News

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How an email from an Irvine engineer to Tim Cook set Apple Watch saga in motion



The Masimo Corp. headquarters in Irvine, California, US, on Tuesday, Dec. 19, 2023. The International Trade Commission ruled earlier this year that the Apple Watch violates two Masimo patents related to blood-oxygen sensing and imposed an import ban on the Ultra 2 and Series 9 models that goes into effect Dec. 25. MUST CREDIT: Bloomberg photo by David Swanson



By **BLOOMBERG** | wordpress@medianewsgroup.com PUBLISHED: December 27, 2023 at 10:02 a.m. | UPDATED: December 27, 2023 at 10:50 a.m.



1/9/24, 9:57 AM

How an email from an Irvine engineer to Tim Cook set Apple Watch saga in motion - Orange County Register

By Mark Gurman | Bloomberg

At about 1 a.m. California time in 2013, a scientist in Irvine emailed Apple's Chief Executive Officer Tim Cook with an irresistible pitch.

"I strongly believe that we can develop the new wave of technology that will make Apple the No. 1 brand in the medical, fitness and wellness market," he wrote in the email, which was later included in legal documents. Some 10 hours after the message was sent, an Apple recruiter was in touch. And just weeks after that, the engineer was working at the tech company on a smartwatch with health sensors.

A flurry of activity began. Within a few months at Apple, the employee asked the company to file about a dozen patents related to sensors and algorithms for determining a person's blood-oxygen level from a wearable device. But this wasn't just any engineer. He had been the chief technical officer of Irvine-based Cercacor Laboratories, the sister company of Masimo Corp., which went on to get to the US to ban the Apple Watch.

Apple's decision to hire this technical whiz — a Stanford engineering Ph.D. named Marcelo Lamego — is seen as the spark that sent Masimo's lawyers after Apple. While the iPhone maker denies it did anything wrong, Masimo cited the poaching of employees as part of claims that the iPhone maker infringed its patents. The dispute culminated this month in Apple having to pull its latest watches from the company's US stores, hobbling a business that generates roughly \$17 billion in annual sales.

Read more: Irvine-based Masimo's CEO open to settling Apple Watch rift

and the second s

Masimo, a maker of medical devices also based in Irvine, argues that Lamego seized its prized asset — the ability to noninvasively and accurately capture the level of oxygen in a person's blood — and took it to Apple. The feature ultimately helped turn the watch into more of a health device, solidifying its status as the wearable industry's best-selling product.

https://www.ocregister.com/2023/12/27/the-late-night-email-to-tim-cook-that-set-the-apple-watch-saga-in-motion/

1/9/24, 9:57 AM

How an email from an Irvine engineer to Tim Cook set Apple Watch saga in motion - Orange County Register

Lawyers for Masimo say that Lamego lacked prior knowledge about how to develop the blood-oxygen feature (his previous studies were about neural interfaces rather than health sensors). He learned how to build the technology at Kiani's companies and delivered it to Apple, they say.

More on med-tech: Masimo, Philips end patent dispute with \$300 million settlement, partnership

Lamego then resigned from Apple in July 2014, just months after joining. Masimo argues that he left after Apple got what it needed. The reality, according to longtime Apple executive Steve Hotelling, is that Lamego didn't fit in at the company. He clashed with managers, demanded multimillion-dollar budgets and wanted the ability to hire his own engineers without approval, Hotelling said in a deposition that was part of a court fight between the companies. After weeks of discussions, Lamego left Apple.

The first Apple Watch was announced three months later, in September 2014. It didn't have the blood-oxygen sensor and instead relied on more basic technologies, such as a pulse reader.

Apple first approached Lamego to join about a year before his email to Cook. The overture happened around the time executives from Apple and Masimo met in 2013, a moment that has become another focal point in the dispute between the two companies. Lamego declined to join Apple at the time, but his tune changed after Kiani refused to make him the CTO of Masimo as well, lawyers for the medical company argue.

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Joe Kiani is the CEO and founder of Masimo. The company has won a series of patent battles against Apple over the tech giant's improper copying of the Orange County firm's health-tracking technology. (Photo credit should read MANJUNATH KIRAN/AFP via Getty Images)

When Apple met with Masimo, it was seeking technology and talent that could bolster its work on the watch. At the time, Masimo believed Apple was interested in doing a deal. The company alleged in a 2020 lawsuit that Apple used the meeting to instead learn about its technology and lay the groundwork for hiring its people. In addition to enlisting Lamego, Apple hired Masimo's former chief medical officer and about 20 other staffers, the medical device company said. Masimo failed to convince a jury of its claims this year.

While the Lamego email was a key piece of evidence for Masimo's lawyers, the effort didn't make much headway with the judge after a senior Apple engineer testified that development of the blood-oxygen feature started in late 2014 — after Lamego had already left. Further, the judge threw out parts of the case relating to Apple's practice of hiring Masimo employees, saying that "recruiting or hiring employees from another company, including from a competitor, does not on its own constitute improper means." The judge also dismissed the idea that Apple stole trade secrets, and a jury sided with Apple 6-to-1.

After his stint at Apple, Lamego ended up starting his own company, True Wearables. In 2016, he released a device called the Oxxiom, which he called the

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When Masimo filed its initial lawsuit, Apple hadn't yet brought a blood-oxygen sensor to market. But eight months later, the Apple Watch Series 6 was introduced with the feature — known in the industry as pulse oximetry — as its key new addition. That led Masimo to file a separate complaint with the US International Trade Commission in 2021 alleging that the feature infringed its patents.

The ITC concurred in October and ordered Apple to remove infringing models from the US, including the current Series 9 and Ultra 2. That prohibition took effect this week after the White House declined to intervene. Apple said it strongly disagrees with the ITC decision and is "taking all measures to return Apple Watch Series 9 and Apple Watch Ultra 2 to customers in the US as soon as possible." A representative for Masimo declined to comment.

Blood oxygen is frequently called the fifth vital sign. A proper level of oxygen saturation — the percentage of oxygen floating in one's bloodstream compared with the maximum it could be — is a requirement for functions like breathing, moving and thinking. It has long been one of the first diagnostics when a patient arrives at a hospital or doctor's office. And the measurement became key at the height of the Covid pandemic, when doctors said that a reading under 95% could suggest a person is struggling to breathe due to the virus.

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FILE – The Apple logo is illuminated at a store in the city center of Munich, Germany, Dec. 16, 2020. Apple plans to suspend sales of the Series 9 and Ultra 2 versions of its popular Apple Watch for online U.S. customers beginning Thursday afternoon, Dec. 21, 2023, and in its stores on Sunday, Dec. 24. The move stems from an Oct. decision from the International Trade Commission restricting Apple's watches with a Blood Oxygen feature as part of an intellectual property dispute with medical technology company Masimo. (AP Photo/Matthias Schrader, File)

Apple argues that Masimo sued it to clear the field for its own consumer-focused wearables. Masimo recently released the W1, a square smartwatch with an array of health sensors. And it's planning to soon release the Freedom watch, which has more health capabilities and a round, more modern-looking design. In an attempt to reach more consumers, it acquired Sound United, owner of speaker maker Bowers & Wilkins, for more than \$1 billion last year.

Apple countersued Masimo in 2022, saying that the W1 took the design of the Apple Watch. "Masimo copied from Apple Watch and is freeriding on Apple's hard work," the company said.

In a Bloomberg interview earlier this month, Kiani said that Apple should have done things differently.

"They didn't have to steal our people — we could have worked with them," he said. "These guys have been caught with their hands in the cookie jar, and — instead of being embarrassed and doing the right thing — they're blaming

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Masimo is a fixture in hospitals. Its equipment for tracking blood oxygen, blood management and other measures is used on more than 200 million patients a year, the company says.



The Apple Watch Series 9 will have to be pulled off the company's shelves if an ITC ban takes effect. MUST CREDIT: Bloomberg photo by David Paul Morris

But part of its revenue over the past two decades has stemmed from lawsuits against medical device competitors, including Royal Philips NV, that turned into settlements or licensing agreements.

Kiani immigrated from Iran when he was 9 and started Masimo in 1989, five years after the original Mac went on sale. While his company now has thousands of workers globally, a market valuation of \$6 billion and annual revenue of about \$2 billion, Kiani says Masimo started as an underdog just like Apple.

He says he took out a second mortgage in his 20s to fund development of the startup in his garage. Though there was already medical gear to monitor blood oxygen, Kiani's breakthrough was tracking it during movement or on people with weak pulses — key features for mass-market wearable devices.

He's also friends with President Joe Biden, one person who could have stopped the Apple Watch sales ban. The White House has the ability to veto import bans to the US, a power it has rarely used. One case came in 2013 when President

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Masimo's goal, people close to the matter say, was for the ITC to impose its ban in the summer. That would have probably led Apple to delay the release of its new models, which are typically unveiled in September, and wiped out the holiday season. Instead, the ban only affected about a week of sales in Apple's December quarter. It also only applies to Apple's own stores; outside retailers like Best Buy Co. can still sell the watches — at least until their inventory runs out.

And Apple believes it's well on its way to a fix. The company had engineers race to change the software algorithms and presentation of its blood-oxygen app to sidestep Kiani's claims. It's now up to the US customs agency to determine if those tweaks are sufficient to allow the smartwatches back on the market. A decision is expected on Jan. 12.

The company is also trying to get the ITC's order overturned by the US Court of Appeals for the Federal Circuit. For his part, Kiani doesn't believe a software fix will resolve a dispute that involves hardware patents. "I don't think that could work," he said.

In any case, Kiani and Masimo have gone further than anyone before them. Many companies have made arguments that Apple has stolen their technology and poached staff, putting them out of business or sending them into bankruptcy. But they've rarely gotten much traction.

A further mark of success for Kiani would be a settlement, which would bring a payday but also vindication. Masimo's website touts all the companies that license its technology and adding Apple to that list would be a triumph. It also would give Masimo marketing muscle for promoting its own products. Apple says it has held mediation talks with Masimo and that it expects to hold more.

In its earlier suit, which ended with a deadlocked jury, Masimo wanted Apple to pay more than \$3 billion in damages. Kiani isn't saying how much money it would take to reach a licensing agreement now. But he does plan to insist on one concession: "There needs to be an apology."

If that doesn't happen, the two companies are scheduled to return to court — again over patents — in late October.

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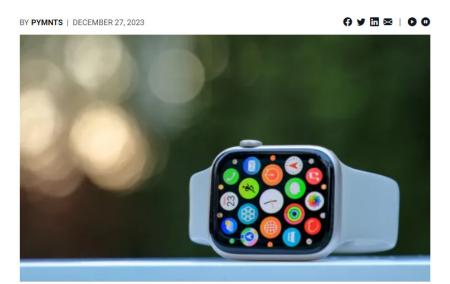
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EXHIBIT 64

https://www.pymnts.com/apple/2023/apple-wins-legal-victory-as-court-lifts-watch-ban/



Apple Wins Legal Victory as Court Lifts Watch Ban



Apple can resume selling its latest smartwatches in spite of a recent import ban.

A federal appeals court on Wednesday (Dec. 27) paused that ban, CNBC reported, allowing the tech giant to once again sell its Series 9 and Ultra 2 watches.

The ban went into place last week following a ruling by the International Trade Commission (ITC) order that found the blood oxygen sensor in the devices had infringed on intellectual property from medical technology firm Masimo.

"The motion for an interim stay is granted to the extent that the Remedial Orders are temporarily stayed," a court filing Wednesday said, per CNBC.

Masimo had sued Apple in 2020, claiming the company had stolen trade secrets associated with health monitoring technology and poached important staff members.

Following the ITC's initial ruling in October, Apple said that Masimo had "wrongly attempted to use the ITC to keep a potentially life-saving product from millions of U.S. consumers while making way for their own watch that copies Apple."

Apple had appealed that ruling, but the ITC last week denied that request, thus halting imports and future sales of the newest watches. Previously imported Apple Watches can be sold if retailers still have them in stock. The ban also does not affect older versions of the watch, which do not include the disputed blood-oxygen sensor.

With the ITC refusing to lift the ban, Apple had hoped for the White House to overrule the agency. However, the administration — personified here by the U.S. Trade Representative — declined to intervene earlier this week.

The CNBC report notes that Apple Watch sales are part of the company's wearables business, which recorded \$39.8 billion in sales in Apple's fiscal 2023.

That coincides with a growing interest — and use of — among consumers in connected devices that monitor the "progress of everything, from the number of steps walked to vital signs to reminders about prescriptions," PYMNTS wrote earlier this year.

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EXHIBIT 65

Apple Scores Big Break in Apple Watch Sales Ban

businessinsider.com/apple-wins-emergency-pause-watch-sales-import-ban-appeals-court-2023-12

Steven Tweedie



A US appeals court agreed to Apple's emergency request to pause the import ban on the latest Apple Watch models.

Michael M. Santiago/Getty Images

- A US appeals court granted <u>Apple's emergency request to pause a US sales ban</u> on some of its watches.
- The Apple Watch Series 9 and Ultra 2 were pulled from the company's online and physical stores.
- Apple can resume selling all its Apple Watch models in its US stores and online for now.

Apple just scored a big break.

It can continue to import and <u>sell its latest Apple Watch models in the US</u> — for now.

On Wednesday, the US Court of Appeals for the Federal Circuit granted Apple's emergency request to temporarily pause an import ban on the Apple Watch Series 9 and Ultra 2 models in the US from going into effect.

"We are thrilled to return the full Apple Watch lineup to customers in time for the new year," Apple said in a statement to Business Insider. "Apple Watch Series 9 and Apple Watch Ultra 2, including the blood oxygen feature, will become available for purchase again in the United States at Apple Stores starting today and from apple.com tomorrow by 12pm PT."

The import ban, which led <u>Apple to pull the affected watch models</u> from its online and physical stores in recent days, stemmed from a patent dispute between the company and the medical-device maker Masimo.

The US International Trade Commission ruled that <u>Apple had violated multiple Masimo</u> <u>patents</u> related to blood-oxygen monitoring.

Apple has appealed the ruling, which President Joe Biden declined to veto, arguing that the import ban will cause "irreparable harm" to its business.

"Apple's teams have worked tirelessly over many years to develop technology that empowers users with industry-leading health, wellness and safety features and we are pleased the U.S. Court of Appeals for the Federal Circuit has stayed the exclusion order while it considers our request to stay the order pending our full appeal," Apple said in its statement.

While the company was still allowed to sell its budget Apple Watch SE under the International Trade Commission order, one analyst estimated the <u>import ban could cost</u> Apple \$300 million to \$400 million in lost sales.

Apple has earned itself some more time as the appeals court weighs whether to grant Apple a longer-term pause on the ruling. The International Trade Commission now has until January 10 to submit its opposition to Apple's motion to pause the import ban during the appeal, according to court documents.

But for now, it looks like Apple CEO Tim Cook just found one more present under the Christmas tree — and it was a big one.

EXHIBIT 66

Banned Apple Watches Are Back On Sale ---Appeals court temporarily lifts prohibition imposed over patent dispute

Tilley, Aaron

FULL TEXT

Apple won approval Wednesday to restart most sales in its \$18 billion smartwatch business after a U.S. appeals court paused a federal agency's import ban on some models of the device.

The Apple Watch Series 9 and Ultra 2 models, for which sales were halted in the past week, were once again available in stores on Wednesday and are slated to return online Thursday, according to the company. They will continue to be sold in the coming weeks while the court weighs Apple's request to stay the ban while its appeal is considered. In October, the U.S. International Trade Commission banned the import into the U.S. of some versions of the Apple Watch after finding that Apple violated the patents of Masimo, an Irvine, Calif.-based medical technology company.

Separately, Apple has sought approval from U.S. Customs and Border Protection on redesigned versions of the two watch models subject to the ban. The customs office, responsible for enforcing import bans, is scheduled to decide on Jan. 12 whether Apple's redesign complies with the trade agency's finding. The Biden administration declined to overturn the ruling by a Dec. 25 deadline.

The technical fix could also allow the watches to be sold in the U.S. again. Apple halted some watch sales Dec. 21 online and in stores after Dec. 24. The watches going on sale will include the blood oxygen feature at the center of the dispute between Apple and Masimo. Previously sold watches weren't affected, nor was the SE model.

The Wall Street Journal reported in April that Masimo and a number of smaller companies alleged that Apple copied their technology and used an aggressive legal strategy through the U.S. patent system to avoid paying royalties. Apple said at the time that it doesn't steal technology and accused Masimo of copying Apple.

While Apple's watch business is tiny compared with its iPhone business, accounting for about 5% of overall sales of about \$383 billion in fiscal 2023, the device plays an important role in the company's growing health ambitions. And Apple is by far the largest smartwatch vendor, representing 30% of all smartwatches shipped and nearly 60% of total global sales, according to Counterpoint Research.

After the October order from the trade commission, the Biden administration had 60 days to overrule it, a period that ended Christmas Day. In those two months, Apple didn't engage with Masimo over any potential settlement, Masimo said.

The patented technology in dispute is a sensor called a pulse oximeter that measures the blood oxygen levels of users. Masimo, a leading provider of that type of sensor, alleged to the commission in 2021 that Apple had violated its patents by including a pulse oximeter in its smartwatches starting with the Series 6 model, released in 2020. Masimo and Apple began their relationship in 2013. Apple had invited Masimo executives to its corporate campus to learn more about the company's health-sensing technology and discuss potential integration opportunities. Internally, Apple executives even discussed the possibility of acquiring Masimo and making its chief executive, Joe Kiani, a vice president, according to documents made public in litigation.

Apple decided against buying Masimo because "acquisitions of this size aren't our style," according to an internal company email.



Rather than joining with or buying the company, Apple chose to hire its engineers and work on similar technology itself, Masimo said.

This early sequence of events between Masimo and Apple followed a pattern, the Journal reported. A number of small technology companies alleged that Apple would begin early partnership discussions, only to abandon them and then copy their technology.

If companies pursued Apple in courts over intellectual property claims, Apple would respond with an aggressive legal strategy through the U.S. patents system to avoid having to pay royalties, these companies alleged. Apple said it doesn't steal technology and its use of the patent system is fair and consistent with other companies of its size. Credit: By Aaron Tilley

DETAILS

| Subject: | Wearable computers; Bans; Patents; Royalties; Smartwatches; Sales; Pulse oximetry | |
|--------------------------|---|--|
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| Location: | United StatesUS | |
| Company / organization: | Name: Apple Inc; NAICS: 334111, 334220, 513210 | |
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EXHIBIT 67

Apple Watches are back on sale after ban paused by federal court

H thehill.com/policy/technology/4380551-apple-watches-are-back-on-sale-after-ban-paused-by-federal-court

Julia Shapero December 28, 2023



MILAN, ITALY – SEPTEMBER 22: The Apple Watch Series 9 on display in store on September 22, 2023 in Milan, Italy. After Apple's announcement of the iPhone 15 series on September 12, including the iPhone 15, iPhone 15 Plus, iPhone 15 Pro, and iPhone 15 Pro Max, the highly anticipated lineup is now available for in-store pickup starting today. (Photo by Ming Yeung/Getty Images)

The latest Apple Watch models are back on sale in the United States after a federal appeals court granted the tech giant's request to <u>temporarily pause</u> an import ban on some of its smartwatches.

The Apple Watch Series 9 and Ultra 2, which were pulled shortly before Christmas in preparation for the ban, became available for purchase once again in stores Wednesday and online Thursday afternoon.

"We are thrilled to return the full Apple Watch lineup to customers in time for the new year," Apple said in a statement.

The U.S. Court of Appeals for the Federal Circuit agreed to pause enforcement of the import ban from the International Trade Commission (ITC) on Wednesday while it considers granting Apple a longer-term stay pending appeal.

Apple appealed the ITC's decision and asked for an immediate interim stay on Tuesday, shortly after the ban went into effect.

Apple fights ban on Apple Watch imports: Here's what happens next "Apple's teams have worked tirelessly over many years to develop technology that empowers users with industry-leading health, wellness and safety features and we are pleased the U.S. Court of Appeals for the Federal Circuit has stayed the exclusion order while it considers our request to stay the order pending our full appeal," Apple added.

The ban stems from a years-long patent dispute with medical technology company Masimo, which accused Apple of poaching employees and stealing trade secrets related to its light-based technology for measuring blood-oxygen levels.

Masimo sued Apple in federal court in 2020 and at the ITC in 2021. While its federal case ended in a mistrial in May, an ITC judge sided with the medical device maker in January in a decision that was ultimately upheld by the full commission in October.

The Biden administration, which had 60 days from the October decision to weigh in, said Tuesday that it would not intervene, allowing the ban to take effect.

Tags Apple Apple Watch Apple Watch ban

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EXHIBIT 68

The Entrepreneur Who Bet His Company on a Fight With Apple

Joe Kiani has taken on Apple in a patent dispute that has cost his company millions of dollars to pursue. So far he is winning, but the fight isn't over.

By Aaron Tilley Follow

Dec. 30, 2023 5:31 am ET

Masimo MASI -1.32% ▼ Chief Executive Joe Kiani bet the future of the company he spent three decades building in an expensive legal battle with the world's most valuable company. So far, he is winning, but it isn't over.

His company, which pioneered a better method for measuring blood-oxygen levels, has spent around \$100 million fighting Apple AAPL -3.71% ▼ in a dispute that temporarily halted Apple Watch sales.

Sales have resumed while a court weighs the company's request to stay the ban during an appeal. Kiani has vowed to fight on and said he won't settle with Apple unless the tech giant pays for his technology and agrees to change how it interacts with smaller companies.

Apple has denied allegations that it stole Masimo's technology and has accused the company of copying its technology.



Joe Kiani, in a striped shirt, with family members in Alabama in the 1970s after their move from Iran. PHOTO: JOE KIANI

Kiani has prevailed in previous battles over his company's intellectual property and believes he will win this one as well. An Iranian immigrant, Kiani has a combination of pugnaciousness and idealism that friends and associates said leads him to fixate on what he thinks is fair.

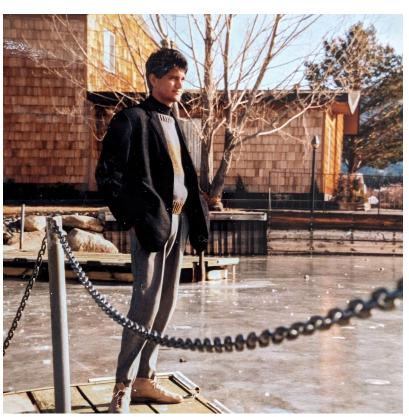
"Justice isn't just blind but very slow," Kiani, 58 years old, said in an interview. "It's painful. It's an ugly thing to go through. It's like war."

Some have seen his aggressive use of the U.S. patent system as exploitation that stymies the innovation of others. In 2006, he prevailed in a seven-year patent spat with Nellcor, a company that was then a dominant provider of a rival pulse oximeter device. In 2016, he beat Royal Philips in another patent-infringement case.

Apple might be Kiani's biggest war yet, one that likely won't be settled for years.

The U.S. International Trade Commission in October ruled that Apple violated Masimo's patents and ordered a ban on some Apple Watches shipped to the U.S., which went into effect Dec. 26. Apple on Wednesday won a reprieve to resume sales. In addition to Apple's appeal, there are several related lawsuits working their way through the court system.

Case: 24-1285 Document: 25-4 Page: 135 Filed: 01/10/2024



Joe Kiani in Southern California after graduating with a master's degree from San Diego State University, PHOTO: JOE KIANI

Before taking on Apple, Masimo employees and friends of Kiani warned him on the risks of going forward. "People were telling me I'm crazy and I can't go against Apple," said Kiani. "They have unlimited resources."

A number of smaller companies have over the years made similar allegations against Apple over taking their ideas and violating their patents, The Wall Street Journal reported in April. When these companies attempt to claim patent infringements against Apple, the tech giant responds with an aggressive legal strategy through the U.S. patent system.

"No one is standing up to them," Kiani said. "If I can do it, it might change Apple for the better."

An Apple spokeswoman said previously about Masimo's claims: "We deeply respect intellectual property and innovation and do not take or use confidential information from other companies. We will continue to protect the innovations we advance on behalf of our customers against false claims."

Born in Iran, Kiani moved with his family to Alabama when he was 9 in order for his father to study engineering. The family brought \$10,000 and lived for a time

in public housing.



A Masimo pulse oximeter was displayed at a Las Vegas consumer technology trade show in 2013. PHOTO: DAVID BECKER/GETTY IMAGES

Kiani, who now has three children and counts himself as a lover of Persian poetry and Pink Floyd, excelled in math and was placed several grades ahead of his age. As a result, he was smaller than the rest of his classmates, making him a target. "I learned that you can't walk away from bullies," he said. "You have to punch back."

When Kiani was 14, his parents had to move back to Iran, leaving him and his sister alone. He graduated early from high school and by 1987 had earned a master's degree in electrical engineering from San Diego State University, he said. He founded Masimo in 1989, when he was 24, after the startup he had joined opted not to pursue his design for an

improved pulse oximeter that didn't produce erroneous false alarms when patients moved.

He next took on Nellcor, the leading pulse oximeter provider. In 1994, Nellcor offered to license Masimo's technology. The money would have been enough for Kiani to retire at a young age, said Steve Jensen, Masimo's longtime lawyer. Kiani walked away from the deal when Nellcor wouldn't promise to quickly introduce his technology to patients, Kiani and Jensen said.

Later, Nellcor announced it had technology that allowed blood oxygen to be measured while the user was in motion. In 1999, Masimo sued over patent infringement. In 2006, Nellcor settled and began paying out for damages and royalties that eventually amounted to nearly \$800 million. A spokeswoman for the company that now owns Nellcor said the company disagrees with Masimo's

characterizations of the early licensing discussions as well as the later patent battle, but declined to share more, citing confidential discussions.

In 2009, Masimo sued Royal Philips over a patent-infringement issue and eventually settled in 2016, with Philips paying out \$300 million and agreeing to incorporate Masimo's technology into its product that Kiani said ended up generating more than \$1 billion for Masimo.

At a 2013 consumer-technology show, Masimo revealed a portable pulse oximeter reader that hooked up to Apple devices. A few months later, Apple reached out.

Representatives of the two companies met in 2013. An Apple official said the company didn't dig deep into Masimo's technology, the meeting didn't last long and the two never met in-person again. At the time of the Apple Watch development, Apple met with many other smaller players, not just Masimo, the company said. Apple also said that the two never got close to working together because Masimo was more focused on the clinical side, too far outside Apple's consumer-focused plans.

A few months after that initial 2013 meeting, Apple hired Masimo's chief medical officer. Later it added a top engineer who was working at a Masimo spinoff, as well as dozens of other Masimo employees. In a later trial, the former Masimo chief medical officer and another former employee testified that Apple hadn't asked them to bring confidential Masimo information to the company and had, in fact, told them explicitly not to do so.



Apple announced the Apple Watch Series 6 with a pulse oximeter in 2020. PHOTO: APPLE

In 2019, Apple published a number of patents related to sensing blood-oxygen levels, listing the former engineer of the Masimo spinoff as the inventor.

"It really felt like a knife in my stomach," said Mohamed Diab, a founding coinventor of Masimo's technology. "It was truly painful."

Masimo sued Apple in January 2020 over allegations that Apple stole its trade secrets. Apple announced the Apple Watch Series 6 with a pulse oximeter later that year. The case, along with other legal efforts against Apple, has cost Masimo about \$100 million so far. The publicly traded company posted about \$144 million in profit in 2022.

Masimo's federal trade-secret case, which is separate from its complaint with the trade commission, went to trial, but it ended with a hung jury in spring 2023. The trade-secret case is scheduled to go back to court in 2024.

Apple has yet to engage in what Kiani sees as serious discussions about a settlement, Kiani said. He remains determined to take his war with Apple to the very end, he said, even if it means losing his company. The mounting legal bills have eaten into his company's profits.

"I feel like I have to do this," said Kiani. "If I can change the most powerful company in the world from continuing to act badly, that'll have more impact on the world than anything else I'm doing."

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